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**TIER II INVESTIGATION – REPORT OF FINDINGS  
BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA**

Prepared by:



**4875 Longley Lane, Suite 100  
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**December 17, 2002**

For:

**Nevada Division of Environmental Protection  
333 West Nye Lane  
Carson City, Nevada 89706-0851**



A Report Prepared For:

Ms. Connie Lewis  
Nevada Brownfields Coordinator  
Nevada Division of Environmental Protection  
333 West Nye Lane  
Carson City, Nevada 89706-0851

**TIER II INVESTIGATION – REPORT OF FINDINGS  
BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA**

Kleinfelder, Inc. Job No. 15562.01

Prepared By:

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Environmental Geologist

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been provided in a manner consistent with the current standards of the profession and to the best of my knowledge comply with all applicable Federal, State and local statutes, regulations, and ordinances.
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Reviewed by:

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December 17, 2002

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Ms. Connie Lewis  
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333 West Nye Lane  
Carson City, Nevada 89706-0851

**SUBJECT: Tier II Investigation – Report of Findings  
Belaustegui Park  
Battle Mountain, Nevada**

Dear Connie:

Kleinfelder is pleased to submit this Tier II Investigation Report of Findings for Belaustegui Park, Battle Mountain, Nevada.

In general, the findings of the Tier II Investigation document the presence of petroleum compounds in soil and groundwater at the subject site. The analytical results also indicate that barium is present in soil at elevated concentrations. The following report documents the field investigation activities, soil and groundwater analytical results, discussion of results, conclusions, and recommendations. Generally, we recommend that additional investigation activities be performed to assess the extent of barium and petroleum impact to subject site soil.

If you have any questions or require additional information, please do not hesitate to call either of the undersigned at (775) 689-7800.

Respectfully Submitted,

**KLEINFELDER, INC.**

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cc: Ms. Deborah Hinze, Community Development Specialist, Lander County

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**TIER II INVESTIGATION – REPORT OF FINDINGS  
BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA**

**1.0 INTRODUCTION**

**1.1 Project Information**

Kleinfelder, Inc. (Kleinfelder) performed a Tier II Investigation at Belaustegui Park (Site) in Battle Mountain, Nevada in accordance with the approved Sampling and Analysis Plan (SAP) dated July 17, 2002. The fieldwork was performed from August 26 through September 3, 2002. This work was performed following a Phase I ESA that identified the potential for the presence of VOCs, TPH, and barium in Site soil and VOCs and TPH in Site groundwater.

**1.2 Project Objectives**

The objective of this investigation, as stated in the approved Sampling and Analysis Plan (SAP), was to obtain sufficient data to assess the potential soil and groundwater impacts at the Site, and to evaluate if remedial action is necessary. To achieve this goal, the Site was assessed to evaluate the soil for VOCs, TPH, and barium and the groundwater for VOCs and TPH.

**1.3 Scope of Services**

The scope of services included the following tasks:

- Preparation of Workplan, SAP and Health and Safety Plan;
- Obtain monitoring well permits, mark sampling locations and notify Underground Service Alert (USA);
- Install ten soil borings and three groundwater monitoring wells, collect soil and groundwater samples and manage investigation derived waste (IDW);
- Coordinate community outreach; and
- Prepare a report of findings.

## 1.4 Soil and Groundwater Investigation

### 1.4.1 Pre-field Activities

Prior to drilling, Kleinfelder marked the Site boundaries with white marking paint. Kleinfelder notified Underground Service Alert (USA) at least 48 hours prior to drilling for utility clearance. Utility location marks were visually observed and photographed prior to drilling (Plate 5). Monitoring well and boring locations were moved as necessary to avoid underground utilities, (Plates 3 and 4). The drilling subcontractor, Boart Longyear a certified well driller, submitted Notices of Intent and Affidavits of Intent to Abandon with the State of Nevada Department of Water Resources.

### 1.4.2 Site Safety Procedures

A safety meeting was held onsite prior to drilling activities. Kleinfelder and Boart Longyear employees attended the meeting and reviewed the Health and Safety Plan (HASP). Kleinfelder and Boart Longyear employees signed an information verification following the safety meeting, Appendix B. In addition to information included in the HASP, the parties present at the safety meeting observed auto, truck and motorcycle traffic on dirt roads and trails on the Site. It was determined that extra attention should be paid to traffic awareness at the Site, as well as dust inhalation. The HASP includes barium as a potential chemical hazard in Site soil, so dust control was employed in the immediate drill area using water to minimize dust generation.

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## 2.0 BACKGROUND

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### 2.1 Site Description

The Site is located in the northeast quarter of the northwest quarter of Section 20, Township 32 North, Range 45 East of the Mount Diablo Baseline and Meridian. The geographic location of the Site is shown on Figure 1. The general layout of the Site is shown on Figure 2. The site is currently undeveloped and no records of onsite development have been found or reported.

The Site occupies approximately 0.494 acres in a commercial area. The Site is generally bordered by Front Street (Highway 40) on the south and by improved dirt roads on the north and east sides.

### 2.2 Operational History

According to the Lander County application for assistance under the Brownfields Program, the Site remains vacant and undeveloped land. Ownership has included the State of Nevada, the Belaustegui family and Lander County. The referenced SRK report indicates that an aerial photograph taken in 1954 showed the Site as vacant land. Two additional photographs dated 1973 and 1984 do not show significant development on the Site.

A loading ramp area was formerly located adjacent to the rail tracks to the south of the Site that is believed to have been used to transfer barite (a principle ore of barium, as barium sulfate). Former automobile service stations and a transfer facility for a chemical company were reportedly located adjacent to the Site.

### 2.3 Previous Investigations

The referenced Phase I ESA, performed by SRK Consulting, identified environmental concerns on adjacent properties with recommendations for further investigation, including:

- Chemical facility with known discharge within 0.5-mile radius of site;

- Numerous auto service facilities with underground storage tanks (UST) and leaking USTs within a 0.5 mile radius of the Site; and
- A barite loadout facility formerly located adjacent to the Site.

The referenced Phase I ESA was prepared for the NDEP.

#### 2.4 Geological Information

The Site soil is mapped as the Reese silt loam (Natural Resource Conservation Service, 1992). The soil to nine inches below ground surface (bgs) is a very friable, strongly alkaline, saline and sodic silty loam. The soil from nine to sixty inches bgs is a friable, strongly alkaline, moderately saline, and moderately sodic stratified silt loam to silty clay loam. The static water level in the vicinity of the Site ranges from six to ten feet below ground surface (bgs) based on data from the Nevada Division of Water Resources Well Log Database.

### 3.0 SITE INVESTIGATION

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#### 3.1 Soil Sampling

On August 26 through 28, 2002, Kleinfelder observed and logged the installation of thirteen soil borings, three of which were completed as monitoring wells. Boring logs are included in Appendix A. Blow count information is not included in all boring logs due to hammer malfunctions and subsequent potential blow count inaccuracy. Boart Longyear of Dayton, Nevada provided hollow-stem auger drilling services.

##### 3.1.1 Barium Soil Sample Collection

On August 26 through 28, 2002, Kleinfelder observed the installation of ten soil borings (B-1 to B-10). Two soil samples were collected from each of the ten soil borings for total and TCLP barium analysis. The soil boring locations and sample depth were selected using a random number generator. Plate 3 shows the soil boring locations. The soil samples were collected by advancing a decontaminated split-spoon sampler, lined with brass tubes, to the selected depth. The brass tubes were sealed with plastic caps, labeled, and placed in an iced cooler.

##### 3.1.2 VOC Soil Sample Collection

On August 27, 2002, Kleinfelder observed the installation of three soil borings that were completed as groundwater monitoring wells (MW-1, MW-2, and MW-3), see Plate 2. Soil samples were collected at five-foot intervals during drilling activities, using a split-spoon sampler. Immediately following opening of the sampler, each of the soil samples was screened for VOCs using a photo-ionization detector (PID). None of the soil samples contained VOCs detectable to the PID, see Appendix B. The soil samples for VOC analysis were then collected using the Encore sampling device. A "soil core" was collected from the end of the brass sleeve, and capped, using the Encore sampling device. The brass sleeve containing the sample for TPH analysis was then sealed using teflon sheets and plastic caps. All soil samples were labeled and placed in an iced cooler.

The soil sample collected at a depth of five feet from each soil boring was submitted for TPH and VOC analysis. The five-foot deep samples were selected for analysis based on the depth to water at the Site, which ranged from approximately 5 to 8 feet below ground surface (bgs). The depth to water and saturated ten-foot deep soil samples indicate that the five-foot deep samples best represent the capillary fringe depth at the Site.

### 3.1.3 Quality Control Sampling

Duplicate soil samples and equipment (rinsate) blanks were collected during soil sampling activities. One rinsate blank was collected each day that equipment was decontaminated in the field. A total of three rinsate blanks were collected; two for total barium analysis and one for TPH and VOC analysis. One duplicate soil sample was collected from MW-3 and submitted for analysis for TPH and VOCs. Two duplicate soil samples were collected from B-2 and B-3 for total and TCLP barium analysis. Due to low volume soil sample recovery at B-1, a quality control duplicate was collected at B-3, not B-1, as originally stated in the SAP.

### 3.1.4 Analytes of Concern for Soil

The soil samples collected from the ten shallow soil borings were submitted for analysis for total barium by EPA Method 700 and TCLP barium by EPA Method 1311.

The samples collected from the three deep borings were submitted analysis for VOCs by SW846 Method 8260B and for TPH by SW846 Method 8015B (gasoline and diesel range organics).

## 3.2 Groundwater Sampling

On August 27, 2002, Kleinfelder observed the installation of three soil borings that were completed as monitoring wells (MW-1 to MW-3) (see Plate 2). Boring logs and monitoring well construction information are included in Appendix A. Boart Longyear of Dayton, Nevada provided hollow-stem auger drilling services.

### 3.2.1 Monitoring Well Construction

On August 27, 2002 Kleinfelder observed the installation of three soil borings that were completed as monitoring wells (MW-1, MW-2 and MW-3). Table 1 includes monitoring well construction data. The monitoring wells were constructed of 2-inch diameter, schedule 40 PVC

with ten feet of 0.010-inch factory slotted screen and five feet of blank casing. The annular space around the screened interval was filled with silica sand to approximately two feet above the well screen, and sealed with a minimum two foot thick bentonite pellet plug above the sand pack. The remainder of the annular space was filled with a cement/bentonite slurry to the ground surface. A threaded cap was placed at the bottom of the well screen section, and a protective steel christy box was placed in the cement slurry at the top of the well. A pressure cap and lock was used to seal the casing at each wellhead. Monitoring well construction details are included in the boring logs. A photograph of the completed MW-1 wellhead is shown in Photograph 4, Plate 5.

On August 27 and 28, 2002, Kleinfelder performed development activities at each of the monitoring wells. Monitoring well development logs are included in Appendix B. Monitoring well development included bailing and pumping the wells to remove sediment and improve water clarity. On August 28, 2002, Kleinfelder performed a relative elevation survey on the north side on the top of well casing at each monitoring well. A mark was placed on the well casing at the survey location for depth to water measurements. Table 1 includes monitoring well elevation data.

### 3.2.2 Groundwater Sample Collection

On September 3, 2002, Kleinfelder collected groundwater samples from the three monitoring wells. Prior to sample collection depth to water was measured to within 1/100<sup>th</sup> of a foot at each well. Three to five well casing volumes were purged from each of the wells using a disposable bailer. During purging, pH, electrical conductivity and temperature measurements were collected on monitoring well sample records, see Appendix B. Following stabilization of the parameters, samples were collected using a new, disposable bailer. Groundwater samples were sealed, labeled and placed in an iced cooler.

### 3.2.3 Quality Control Sampling

One field blank was collected during sampling activities, and submitted for TPH and VOC analysis. One duplicate water sample was collected at MW-3 and submitted for TPH and VOC analysis.

### 3.2.4 Analytes of Concern for Groundwater

The groundwater samples were submitted for analysis for VOCs by SWEPA Method 8260B and for TPH by SWEPA Method 8015B.

### 3.2.5 Geological and Hydrogeological Information

Soils encountered during drilling included silty and clayey sands, sand with occasional gravel and rare cobbles. Flowing sands were encountered from approximately ten to fifteen feet bgs in MW-3. Groundwater was encountered during drilling at depths ranging from 6 to 8 feet bgs. Table 1 presents relative groundwater elevation data. The groundwater flow direction was calculated as northeast at a gradient of 0.0013 feet/foot. Plate 4 shows the approximate groundwater flow direction and groundwater relative elevation isocountours. Slug tests were not performed, but monitoring wells were observed to bail dry during development and sampling activities.

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## 4.0 RESULTS

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### 4.1 Laboratory Analyses

Soil sample analytical results for total and TCLP barium analysis are summarized in Table 2. Soil sample analytical results for TPH and VOCs are summarized in Table 3. Groundwater analytical results are summarized in Table 4. Copies of the analytical data are included as Appendix C.

### 4.2 Project Data Quality Objectives

The data collected for this project was definitive data. Definitive data are the result of quantitating organic and inorganic compounds using EPA procedures. The data met the established QA criteria and is therefore suitable for use in subsequent risk assessment, site characterization, alternative evaluation, engineering design, and Remedial Action Plan reporting.

#### 4.2.1 Data Quality Objectives

Based on the analytical results the primary analytes of concern at the site are barium and TPH-DRO. The data collected during this Tier II Investigation will be used to make risk based assessments regarding the suitability of the Site to be developed into a public park. The applicable action levels for barium and TPH-DRO are those levels implemented by the NDEP for TPH in soil, free product on groundwater, and the EPA Federal Drinking Water Standards. The TCLP barium action level for groundwater is 100 mg/l. The action levels for this project are summarized in Tables 5 and 6.

The data collected during this investigation met QA criteria, as described below, and therefore meet the project DQO.

#### 4.2.2 Data Quality Indicators (DQI)

The effectiveness of the QA program is measured by the quality of data generated by the laboratory. Data quality is judged in terms of its Precision, Accuracy, Representativeness, Completeness, and Comparability (PARCC) parameters, as described in the following section.

##### **Precision**

Precision is a measure of the reproducibility of analyses under a given set of conditions. Precision can be assessed by replicate measurements of duplicate control samples, reference materials, or environmental samples.

The comparison of precision was measured by the calculating the Relative Percent Difference (RPD) between field and LFM initial and duplicate QC samples. The RPD between the two duplicate samples may be used to estimate precision, and was calculated as follows:

$$RPD = \frac{|D_1 - D_2|}{(D_1 + D_2) / 2} \times 100$$

*Where:*

- RPD* = *relative percent difference*
- D1* = *first sample value*
- D2* = *second sample value (duplicate)*

The RPD were calculated by the EPA laboratory for water samples analyzed for TPH-GRO, TPH-DRO and total barium, and for soil samples analyzed for TPH-DRO, TPH-GRO, total barium and TCLP barium. The calculated RPD for LFM and LFM duplicates are within QC limits.

The RPD for the soil samples and QC duplicates collected from B-2 and B-3 and analyzed for total barium were 43.0% and 94.1%, respectively. These RPD indicate a level of precision that is most likely a result of soil sample matrix variation. The RPD for the soil samples and QC duplicates collected from B-2 and B-3 and analyzed for TCLP barium were both 0.0%, since the QC duplicate sample concentrations were equal to initial sample concentrations. The RPD for the soil samples and QC duplicates collected from MW-3 and analyzed for TPH was 92.0%.

This RPD indicates a level of precision that is most likely a result of soil sample matrix variation. VOCs were not detected in the soil samples collected from MW-3. The RPD for the groundwater sample and QC duplicate collected from MW-3 was 2.6%. This indicates good precision for groundwater samples.

### Accuracy

Accuracy is a determination of how close the measurement is to the true value. Accuracy can be assessed using laboratory control samples, standard reference materials, or spiked environmental samples. QC limits were met for all QC samples except as described below. The laboratory monitored accuracy by comparing LCS results with control limits established at plus or minus three standard deviation units from the mean of historical LCS results. The accuracy of the data submitted for this project was assessed by calculating the percent recovery of laboratory control samples, and LCS, as well as additional QA/QC data, that did not fall within control limits are summarized below.

The following is information included in the "QA/QC and Analytical Comments" section of the analytical results for soil samples analyzed for VOCs. The analytical results are included in Appendix C. The initial calibration analytes bromomethane and acetone exceeded QC limits. The reported values for the compound in samples and method blanks are estimated. LCS dichlorodifluoromethane exceeded QC limits, and values for the compound in samples were flagged as estimates. No soil samples contained reportable concentrations of VOCs. Surrogate recovery, and re-analysis recovery, for bromofluorobenzene were not within QC limits. This compound is associated with the internal standard, chlorobenzene-d5, and the quantitation limits of all analytes associated with this internal standard were flagged as estimates. No soil samples had reportable concentrations of VOCs. The continuing calibration compound dichlorodifluoromethane exceeded QC limits, so reported values for the compound samples and associated method blanks were flagged as estimated. No target analytes were detected in the method blanks associated with these samples.

The following is information included in the "QA/QC and Analytical Comments" section of the analytical results for groundwater samples analyzed for TPH-DRO. The original extraction from sample MW3-GW-2 revealed low surrogate recoveries. The re-extraction, beyond holding time, was within the QC limits, so the QL for the sample is estimated. The surrogate n-Hexacosane did not meet QC limits. The detected result for this analyte in the sample, MW3-GW-1, is estimated.

The following is information included in the “QA/QC and Analytical Comments” section of the analytical results for groundwater samples analyzed for VOCs. The LCS, dichlorodifluoromethane exceeded QC limits, so the reported values for the compound in samples and associated method blank were flagged as estimated. No groundwater samples contained reportable concentrations of VOCs.

### **Representativeness**

Representativeness is a qualitative parameter that reflects the extent to which a given sample is characteristic of a given population at a specific location or under a given environmental condition. Representativeness is best satisfied by making certain that sampling locations are selected properly, a sufficient number of samples are collected, and an appropriate sampling technique is employed. Variations at a sampling point were evaluated based on the results of field duplicates.

Sampling locations, number of samples collected and appropriate sampling techniques were employed as specified in the approved SAP. Variation at sampling points, based on the field duplicate sample results, was observed for soil samples. This appears to be a result of soil sample matrix variation, and does not appear to indicate a poor representativeness of the soil samples. Only slight variation was observed in water samples which indicates good representativeness of the water samples.

### **Completeness**

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under normal conditions. To be considered complete, the data set must contain all analytical results and data specified for the project. In addition, all data were compared to project requirements to ensure that specifications were met. Completeness was evaluated by comparing the project objectives to the quality and quantity of the data collected to determine if any deficiencies exist. Missing data can result from any number of circumstances ranging from sample acquisition and accessibility problems to sample breakage and rejection of analytical data because of quality control deficiencies. Completeness was quantitatively assessed as the percent of controlled QC parameters that are within limits. The minimum requirement for completeness for all QC parameters, except holding times, is 80%. The requirement for holding times is 100%.

The percent completeness for each set of samples was calculated as follows:

$$\text{Completeness} = \frac{\text{valid data obtained}}{\text{total data analyzed}} \times 100\%$$

Valid data is defined as those data points that are not qualified as rejected. No data were rejected, so the percent completeness for all QC parameters, except hold time, is 100%. None of the soil samples, for VOC analysis, were analyzed within the 48-hour hold time. The samples were received by the lab within hold time, but not analyzed or extracted within hold time. Soil sample hold time for VOC analysis was exceeded by a range of 1 to 13 hours. The data was not rejected by the laboratory, and none of the soil samples contained a reportable concentration of VOCs.

### **Comparability**

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. To ensure comparability, field procedures were standardized and field operations adhered to procedures outlined in the SAP. Laboratory data comparability was assured by use of established and approved analytical methods, consistency in the basis of analysis (wet weight, volume, etc.), and consistency in reporting units (ppm, ppb, etc.).

### **Sensitivity**

Assuring the validity of quantitative measurements at low concentrations is an extremely difficult technical problem. With regulatory reporting requirements and enforceable concentrations dropping over time, the validity of any given measurement becomes even more important. The consequences of false positive or false negative data can be significant.

The laboratory reported results below the QL as “estimated” because, by definition, the reliability of the data at that level is questionable. The required detection limits for the different analytes of concern and the action levels are listed in Tables 5 and 6.

### 4.2.3 Data Review and Validation

The QA Manager supervised data quality assessment tasks. Kleinfelder evaluated and documented measurement data to monitor consistency with DQOs, to quantitatively assess data quality, and to identify potential limitations to data use.

Kleinfelder reviewed field and analytical laboratory data generated for this project as described below. Chain of custody documentation met QC requirements. Holding time compliance was met for all samples except soil samples for VOC analysis, see "Completeness" portion of section 4.2.2. Laboratory batch QC frequency met QC requirements. Results of batch and field QC analyses met QC requirements, with the exceptions described in the "Accuracy" portion of section 4.2.2. The analytical sample results do not appear to have been influenced by outlier QC sample results. After reviewing the QC data that did not fall within QC limits and the analytical results, the assessment is that the project DQOs were met.

EPA Region 9 laboratory system (contract laboratory operating under the EPA quality assurance program) generated all laboratory data. Regularly scheduled analyses of known duplicates, standards, and spiked samples are routine aspects of data reduction, validation, and reporting procedures.

All data produced by the EPA Region 9 laboratory system was reviewed using the tiered approach. All petroleum hydrocarbon data was reviewed using Tier 1A. VOC and barium data was reviewed using Tier 1B. 10% of all data was reviewed using Tier 3. The data reviewed, using Tier 3, was randomly selected by the QA office. The results of the Tier review are pending.

## 4.3 Soil Sample Results

### 4.3.1 Barium Results

A total of 22 soil samples were submitted for total and TCLP barium analysis. The soil samples contained total barium at concentrations ranging from 80 mg/Kg to 6900 mg/Kg. None of the soil samples contained TCLP barium above the quantitation limit (QL), but four samples contained a reported TCLP barium concentration of 2 mg/L. The laboratory reports data results that have a concentration of at least half of the QL as estimated.

#### 4.3.2 Petroleum Compound Results

A total of four soil samples were analyzed for TPH and VOCs. None of the soil samples contained a reportable concentration of VOCs. None of the soil samples for VOCs were analyzed or extracted within the 48-hour hold time, so VOC compounds are reported as estimated. The laboratory did receive the samples within hold time (see Chain of Custody Appendix C). Three of the soil samples contained a reportable concentration of TPH in the range of motor oil. One soil sample collected from MW-1 at a depth of 5 feet bgs contained TPH at a concentration of 20 mg/Kg, which is equal to the quantitation limit. One initial and one QC duplicate soil sample both collected from MW-3 at a depth of five feet bgs, contained TPH at concentrations of 740 and 2000 mg/Kg, respectively.

#### 4.3.3 Quality Control Results

Two quality control duplicate soil samples for total and TCLP barium analysis were collected, one each from borings B-2 and B-3. The reported concentrations at B-2 and B-3 were 3100 mg/Kg total barium, 2 mg/L TCLP barium and 540 mg/Kg total barium, <4 mg/L TCLP barium, respectively.

One quality control duplicate soil sample for TPH and VOC analysis was collected from MW-3. The sample did not contain a reportable concentration of any VOCs, and contained 2,000 mg/Kg TPH, in the range of motor oil.

#### 4.4 Groundwater Sample Results

A total of four groundwater samples were submitted for analysis for TPH and VOCs. None of the groundwater samples contained a reportable concentration of VOCs. Two groundwater samples contained TPH in the range of motor oil. One initial and one QC duplicate groundwater sample both collected from MW-3, contained TPH at concentrations of 900 and 1000 µg/L, respectively.

##### 4.4.1 Quality Control Sample Results

One field blank and one rinseate blank were collected and analyzed for TPH and VOCs. The samples did not contain a reportable concentration of TPH or VOCs.

Two rinseate blanks were collected for total barium analysis. The samples, RB-W-1 and RB-W-2, contained barium at concentrations of 20  $\mu\text{g/L}$  and 40  $\mu\text{g/L}$ , respectively.

## 5.0 DISCUSSION

### 5.1 Soil Sample Results

#### 5.1.1 Barium Results

Nevada does not have an Action Level for barium in soil, so the data was compared to the EPA Region 9 Preliminary Remediation Goal (PRG) for residential use (Appendix D). Since the Site will be redeveloped as a park, the residential PRG was deemed applicable. The PRG for barium is 5400 mg/Kg. The barium concentration in the sample collected from B-9 at a depth of 0 feet bgs (6,900 mg/Kg) exceeds the PRG. This is the only sample to exceed the PRG, but several other soil samples appear to show elevated barium concentrations.

Statistical analysis has not been performed on this data due to the limited quantity of data points, but the lowest reported total barium concentrations in soil range from approximately 100-200 mg/Kg. This barium concentration range may represent an approximate "Site background". Elevated total barium concentrations in soil, relative to the "Site background", appear to be present in samples collected from six of ten soil borings (B-1, B-2, B-3, B-4, B-9, and B-10). In general, total barium concentrations in soil appear to decrease with depth, with the exception of soil boring B-1. This increase in total barium concentration at depth, at B-1, may be a result of fill placement over barium-impacted soil.

None of the soil samples contained TCLP barium in excess of the action level of 100 mg/L. Total barium is present in soil, but no TCLP data were reported to be greater than the QL of 4 mg/L. The reported TCLP barium results, of 2 mg/L, for soil samples collected from B-2 and B-3 appear to correlate with the high total barium concentration in the soil samples. The EPA laboratory calculated RPD for LFM and LFM duplicates as within the established QC limits. The ATSDR report, included in Appendix E, indicates "barium compounds that do not dissolve well in water are generally not harmful".

A comparison of the total barium results to the barium PRG, indicates that additional remedial investigation is warranted. Additional investigation activities should be performed to assess the lateral extent of the barium impact to Site soil.

Based on the presence of barium in Site soil, a potential exists for additional metals to be located on the Site. The source of the barite transferred at the Site is unknown, but barite deposits in the western US have been associated with metals such as gold, silver, iron, arsenic, antimony, lead, and zinc (Ore Deposits, ). Analysis for a minimum of these metals, in addition to barium, should be employed during subsequent investigation activities.

Following additional characterization activities, further remedial options can be considered for evaluation.

#### 5.1.2 Petroleum Compound Results

The Nevada Action Level for TPH in soil is 100 mg/Kg. The motor oil range TPH concentration in the initial and quality control duplicate soil samples collected from MW-3 both exceed the Nevada Action Level for TPH in soil, at 740 mg/Kg and 2,000 mg/Kg, respectively. The soil sample collected from MW-1 contained motor oil range TPH at a concentration of 20 mg/Kg. Based on these results, additional investigation activities should be performed to determine the lateral extent of TPH impact in the vicinity of MW-3. Following additional characterization of lateral TPH extent, further remedial options may be considered for evaluation.

#### 5.1.3 Quality Control Results

Two quality control duplicate soil samples for total and TCLP barium analysis were collected, one each from borings B-2 and B-3. The variability of the total and TCLP barium analytical results for the duplicate soil samples does not appear to be a result of field methodology. The variability of the results may be due to soil sample matrix variability.

One quality control duplicate soil sample for TPH and VOC analysis was collected from MW-3. The sample did not contain a reportable concentration of VOCs. The variability of the TPH analytical results for the duplicate soil samples does not appear to be a result of field methodology. The variability of the results may be due to soil sample matrix variability.

## 5.2 Groundwater Sample Results

The Nevada Action Level for TPH in groundwater is one half inch of free product. Based on the analytical results the groundwater in the vicinity of MW-3 is slightly impacted with TPH in the range of motor oil. The groundwater flow direction is to the northeast, and groundwater samples collected from MW-1 and MW-2 do not contain reportable concentrations of TPH. Based on the available information, no additional groundwater remedial action is warranted. However, if Site groundwater is to be used for any municipal purposes, including irrigation of drinking, production well siting, construction, and use need to comply with all applicable water quality standards.

## 5.3 Quality Control Sample Results

One field blank and one rinseate blank were collected and analyzed for TPH and VOCs. The samples did not contain a reportable concentration of TPH or VOCs. Two rinseate blanks were collected for total barium analysis. The samples, RB-W-1 and RB-W-2, contained barium at concentrations of 20 µg/L and 40 µg/L, respectively. Based on the TCLP barium results from the soil samples, the presence of barium in the rinseate blanks appears to be a result of incompletely deionized water used for rinseate.

## 6.0 DISPOSAL OF RESIDUAL MATERIALS

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The waste soil and water generated during this project were contained in 55-gallon steel drums. Based on the analytical results, the soil and groundwater generated during from MW-3 will be disposed of as a non-hazardous waste. Other waste soil and groundwater can be disposed of as a non-hazardous waste or returned to the Site.

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## 7.0 CONCLUSIONS

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Based on the preceding discussion Kleinfelder makes the following conclusions:

- The Site soil has been impacted by barium in excess of the EPA residential PRG. The lateral extent of the barium impact has not been defined, and therefore warrants further assessment;
- The barium compound present in soil does not appear to be readily soluble;
- The Site soil has been impacted by motor oil range TPH in the vicinity of MW-1 and MW-3. The TPH concentration in soil in the vicinity of MW-3 exceeds the Nevada Action Level of 100 mg/Kg. The lateral extent of the TPH impact in the vicinity of MW-3 has not been defined, and therefore warrants further assessment; and
- The Site groundwater has been impacted in the vicinity of MW-3. The impact appears to be limited to the vicinity of MW-3 and does not warrant further assessment.

## 8.0 RECOMMENDATIONS

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Based on the preceding conclusions, Kleinfelder makes the following recommendations:

- The lateral extent of barium impact to Site soil should be investigated. Soil samples should be collected from those portions of the Site not yet characterized;
- The lateral extent of TPH in soil in the vicinity of MW-3 should be investigated;
- Prepare a Workplan for recommended additional Site investigation activities; and
- A preliminary review of potentially applicable remedial options, incorporating final Site design plans, may be valuable during the preparation of the recommended Workplan for additional investigation.

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## 9.0 REFERENCES

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SRK Consulting, Phase I Environmental Site Assessment for Belaustegui Park, Battle Mountain, Nevada, June 2001.

Kleinfelder, Inc., Tier II Investigation-Sampling and Analysis Plan, Belaustegui Park, Battle Mountain, Nevada, July 17, 2002.

Agency for Toxic Substances and Disease Registry, ToxFAQs for Barium, CAS# 7440-39-3, September 1995.

Guilbert, John M., Park, Charles F. Jr., The Geology of Ore Deposits, Chapter 5, pgs 196-197, 1986.

**LIST OF ACRONYMS AND ABBREVIATIONS**

ATSDR	Agency for Toxic Substances and Disease Registry
bgs	below ground surface
DQO	Data Quality Objectives
DQI	Data Quality Indicators
ESA	Environmental Site Assessment
GC/MS	gas chromatography/mass spectrometry
HASP	Health and Safety Plan
IDW	Investigation Derived Waste
IRIS	Integrated Risk Information System
kg	kilogram
kg/L	kilograms per liter
FB	Field Blank
GW	Groundwater
LCS	Laboratory Control Spike
LFM	Laboratory Fortified Matrix
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
MW	Monitoring Well
NDEP	Nevada Division of Environmental Protection
PRG	preliminary remediation goal
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QC	quality control
RCRA	Resource Conservation and Recovery Act
RB	Rinseate Blank
RPD	Relative Percent Difference
SAP	Sampling and Analysis Plan
QL	quantitation limit
SVOC	semivolatile organic compound
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
USA	Underground Service Alert
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound
µg/L	micrograms per liter

# TABLES

**TABLE 1**

**MONITORING WELL CONSTRUCTION AND GROUNDWATER ELEVATION DATA**  
**AUGUST 2002**  
**BELAUSTEGUI PARK, BATTLE MOUNTAIN, NEVADA**

Well Number	Date of Measurement	Diameter (inches)	Relative Wellhead Elevation (feet)	Total Well Depth (feet)	Depth to Water (feet)	Relative Static Water Elevation (feet)
MW-1	9-3-02	2	100.00	15.01	8.22	91.78
MW-2	9-3-02	2	97.15	15.40	5.20	91.95
MW-3	9-3-02	2	99.60	14.80	7.57	92.03

- Notes:
- 1) All wells are Schedule 40 PVC, and have 10 feet of screen with 0.010-inch perforations.
  - 2) An arbitrary elevation of 100.00 feet was established, for reference purposes, at MW-1.

**TABLE 2**

**SOIL SAMPLE BARIUM ANALYTICAL RESULTS  
 BELAUSTEGUI PARK, BATTLE MOUNTAIN, NEVADA**

Sample Number	Boring Number	Depth (feet)	Date	Barium (mg/Kg)	TCLP Barium (mg/L)
B1-S-2-1	1	2	8-26-02	200	2 <sup>(2)</sup>
B1-S-5-2	1	5	8-26-02	3200	<4
B2-S-1-1	2	1	8-26-02	4800	2 <sup>(2)</sup>
B2-S-1-2 <sup>(1)</sup>	2	1	8-26-02	3100	2 <sup>(2)</sup>
B2-S-4-3	2	4	8-26-02	220	<4
B3-S-1-1	3	1	8-27-02	1500	<4
B3-S-1-2 <sup>(1)</sup>	3	1	8-27-02	540	<4
B3-S-5-3	3	5	8-27-02	480	<4
B4-S-3-1	4	3	8-28-02	870	<4
B4-S-4-2	4	4	8-28-02	170	<4
B5-S-3-1	5	3	8-28-02	180	<4
B5-S-4-3	5	4	8-28-02	100	<4
B6-S-2-1	6	2	8-28-02	120	<4
B6-S-4-2	6	4	8-28-02	160	<4
B7-S-3-1	7	3	8-28-02	130	<4
B7-S-5-2	7	5	8-28-02	80	<4
B8-S-2-1	8	2	8-28-02	150	<4
B8-S-3-2	8	3	8-28-02	160	<4
B9-S-0-1	9	0	8-28-02	6900 <sup>(3)</sup>	2 <sup>(2)</sup>
B9-S-3-2	9	3	8-28-02	190	<4
B10-S-1-1	10	1	8-28-02	2000	<4
B10-S-2-2	10	2	8-28-02	1900	<4
EPA Method:				6010 <sup>(4)</sup>	1311/200.7

Notes:

- 1) Quality Control samples
- 2) Result is estimated and reported below quantitation limit of 4 mg/L.
- 3) Exceeds EPA Region 9 residential Preliminary Remediation Goal (PRG) for barium of 5400 mg/Kg
- 4) Quantitation limit is 10 mg/Kg

**TABLE 3**

SOIL SAMPLE PETROLEUM ANALYTICAL RESULTS  
 BELAUSTEGUI PARK, BATTLE MOUNTAIN, NEVADA

Sample Number	Boring Number	Depth (feet)	Date	VOC (µg/kg)	TPH-GRO (mg/kg)	TPH-DRO (Diesel) (mg/Kg)	TPH-DRO (Motor Oil) (mg/kg)
MW1-S-5-1	MW-1	5	8/27/02	ND <sup>(2)</sup>	ND	ND	20
MW2-S-5-1	MW-2	5	8/27/02	ND <sup>(2)</sup>	ND	ND	ND
MW3-S-5-1	MW-3	5	8/27/02	ND <sup>(2)</sup>	ND	ND	740
MW3-S-5-2 <sup>(1)</sup>	MW-3	5	8/27/02	ND <sup>(2)</sup>	ND	ND	2000
EPA Method:				8260B	5030B, 5035, 8015B, 8021B	8015B, 3545	8015B, 3545

Notes:

- 1) Quality Control samples
  - 2) Samples not analyzed or preserved within hold time, results are estimated
- ND = Not detected at or above method quantitation limit  
 VOC = Volatile Organic Compound  
 TPH-DRO (Diesel) = Total petroleum hydrocarbons – diesel range organics  
 TPH-DRO (Motor Oil) = Total petroleum hydrocarbons – motor oil range organics  
 TPH-GRO = Total petroleum hydrocarbons – gasoline range organics

**TABLE 4**

**GROUNDWATER SAMPLE ANALYTICAL RESULTS  
BELAUSTEGUI PARK, BATTLE MOUNTAIN, NEVADA**

Sample Number	Well Number	Date	Barium (µg/L)	VOC (µg/L) <sup>(2)</sup>	TPH-GRO (µg/L)	TPH-DRO (Diesel) (µg/L)	TPH-DRO (Motor Oil) (µg/L)
MW1-GW-1	MW-1	9-3-02	NA	ND	ND	ND	ND
MW2-GW-1	MW-2	9-3-02	NA	ND	ND	ND	ND
MW3-GW-1	MW-3	9-3-02	NA	ND	ND	ND <sup>(3)</sup>	900 <sup>(3)(4)</sup>
MW3-GW-2 <sup>(1)</sup>	MW-3	9-3-02	NA	ND	ND	ND <sup>(3)</sup>	1000 <sup>(3)(5)</sup>
FB-W-1 <sup>(1)</sup>	Field Blank	9-3-02	NA	ND	ND	ND	ND
RB-W-2 <sup>(1)</sup>	Rinseate Blank	8-27-02	NA	ND	ND	ND	ND
RB-W-1 <sup>(1)</sup>	Rinseate Blank	8-26-02	40	NA	NA	ND	NA
RB-W-3 <sup>(1)</sup>	Rinseate Blank	8-28-02	20	NA	NA	ND	NA
EPA Method:			200.7 <sup>(6)</sup>	524.2	5030B, 5035, 8015B, 8021B	8015B, 3520C	8015B, 3520C

ND = Not detected at or above method quantitation limit

VOC = Volatile Organic Compound

TPH-DRO = Total petroleum hydrocarbons – diesel range organics

TPH-GRO = Total petroleum hydrocarbons – gasoline range organics

mg/L = milligrams per liter

µg/L = micrograms per liter

- 1) Quality Control samples
- 2) Dichlorofluoromethane value estimated
- 3) Estimated analyte value
- 4) Reported analyte concentration is estimated and below quantitation limit but greater than half of the detection limit
- 5) Reported analyte concentration is estimated and equal to the quantitation limit
- 6) Quantitation limit is 4mg/L

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**TABLE 5**

QUANTITATION LIMITS AND ACTION LEVELS FOR  
 TOTAL PETROLEUM HYDROCARBONS BY GC (SWEPA 8015B)  
 BELAUSTEGUI PARK, BATTLE MOUNTAIN, NEVADA

Component of Concern	QL - Soil (mg/kg)	Action Level - Soil (mg/Kg)	QL - Water (µg/l)	Action Level - Water
TPH-DRO <sup>(2)</sup> (diesel)	5.0	100	200	0.5 inch free product
TPH-DRO <sup>(2)</sup> (motor oil)	20.0	100	1000	0.5 inch free product
TPH-GRO <sup>(2)</sup>	5.0	NA	50	0.5 inch free product

Note:

TPH-DRO = Total petroleum hydrocarbons – diesel range organics  
 TPH-GRO = Total petroleum hydrocarbons – gasoline range organics  
 QL – Quantitation Limits

**TABLE 6**

QUANTITATION LIMITS AND ACTION LEVELS FOR  
VOLATILE ORGANIC COMPOUNDS BY GC/MS (SWEPA 8260B)  
BELAUSTEGUI PARK, BATTLE MOUNTAIN, NEVADA

Compound	QL – Water (µg/L)	Action Level- Water (µg/L)	QL – Soil (µg/kg)	Action Level- Soil (µg/kg)
Dichlorodifluoromethane	1		10	
Chloromethane	1	-	10	2,600
Vinyl Chloride	0.5	2	10	35
Bromomethane	1	-	10	23,000
Chloroethane	1	-	10	-
Trichlorofluoromethane	1	-	10	1,300,000
1,1-Dichloroethene	1	7	10	80
1,1,2- Trichlorotrifluoroethane	1		NA	
Acetone	4	-	10	8,800,000
Methylene Chloride	1		NA	
Carbon Disulfide	NA	-	10	24,000
Dibromomethane	1		NA	
Dichloromethane	NA	5	10	18,000
Methyl t-butyl ether (MTBE)	1	20-200	10	
Trans-1,2-Dichloroethene	1	100	10	270,000
1,1-Dichloroethane	1	-	10	1,700,000
1,1-Dichloropropene	1		NA	
2,2-Dichloropropane	1		NA	
Ethyl t-butyl ether	NA		10	
cis-1,2-Dichloroethene	1	70	10	-
2-Butanone	4	-	10	27,000,000
Chloroform	1	80	10	530
1,2-Dichloroethane	0.5	5	10	550
Tert-amyl-methyl ether	NA		10	
1,1,1-Trichloroethane	1	200	10	3,000,000
Carbon Tetrachloride	0.5	5	10	500
Benzene	1	5	10	1,400
Trichloroethene	1	5	10	7,000
1,2-Dichloropropane	1	5	10	680
Bromochloromethane	1		10	
Bromodichloromethane	1	80	10	1,400
cis-1,3-Dichloropropene	0.5	-	10	550
Trans-1,3-dichloropropene	0.5	-	10	550
1,1,2-Trichloroethane	1	5	10	1,500

Notes: QL – Required Detection Limits

**TABLE 6 Continued**

Compound	QL – Water (µg/L)	Action Level- Water (µg/L)	QL – Soil (µg/kg)	Action Level- Soil (µg/kg)
Dibromochloromethane	1	80	10	23,000
4-Methyl-2-Pentanone	NA	-	10	-
Toluene	1	1000	10	880,000
Tetrachloroethene	1	5	10	17,000
1,3-Dichloropropane	1		10	
2-Hexanone	NA	-	10	-
1,2-Dibromoethane	1	-	10	20
Chlorobenzene	1	100	10	220,000
Ethylbenzene	1	700	10	230,000
m,p-Xylene	1	10000	10	320,000
o-Xylenes	1	10000	10	320,000
Styrene	1	100	10	680,000
Bromoform	1			
Isopropylbenzene	1		NA	
Bromobenzene	1			
1,1,1,2-Tetrachloroethane	1			
1,1,2,2-Tetrachloroethane	1	-	10	1,100
1,2,3-Trichloropropane	1		10	
n-Propylbenzene	1		NA	
2-Chlorotoluene	1		NA	
4-Chlorotoluene	1		NA	
1,3,5-Trimethylbenzene	1			
tert-Butylbenzene	1		NA	
1,2,4-Trimethylbenzene	1			
sec-Butylbenzene	1		NA	
1,3-Dichlorobenzene	1		10	
1,4-Dichlorobenzene	1		10	
p-Isopropyltoluene	1		NA	
1,2-Dichlorobenzene	1		10	
n-Butylbenzene	1		NA	
1,2-Dibromo-3-chloropropane	2		10	
1,2,4-Trichlorobenzene	1		NA	
Hexachlorobutadiene	1		NA	
Napthalene	1		NA	
1,2,3-Trichlorobenzene	1		NA	

Notes: QL – Required Detection Limits

# Draft

**TABLE 7**  
**SUMMARY OF FIELD SAMPLING**  
**BELAUSTEGUI PARK, BATTLE MOUNTAIN, NEVADA**

Monitoring Well / Boring Number	Number of samples	Approximate sample depth	Sample matrix	Analytical Methods	No. QC duplicates, method	No. of rinsate blanks, method
MW1	3 (MW1-S-5-01) (MW1-S-10-02) (MW1-S-15-03)	5, 10, 15 feet	Soil	SWEPA 8015B – DRO/GRO		1 (RB-W-1) TPH-E 8015B DRO/GRO SWEPA 8260B
	1 (MW1-GW-1)		Groundwater	SWEPA 8015B – DRO/GRO SWEPA 8260B		
MW2	3 (MW2-S-5-04) (MW2-S-10-05) (MW2-S-15-06)	5, 10, 15 feet	Soil	SWEPA 8015B – DRO/GRO		
	2 (MW2-GW-2)		Groundwater	SWEPA 8015B – DRO/GRO SWEPA 8260B		
MW3	3 (MW3-S-5-07) (MW3-S-10-08) (MW3-S-15-09)	5, 10, 15 feet	Soil	SWEPA 8015B – DRO/GRO	1 (MW2-S-10-10) SWEPA 8015B – DRO/GRO SWEPA 8260B	
	1 (MW3-GW-3)		Groundwater	SWEPA 8015B – DRO/GRO SWEPA 8260B	1 (MW2-GW-4) SWEPA 8015B – DRO/GRO SWEPA 8260B	
BI	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP		

Note: TPH-DRO – Total Petroleum Hydrocarbons – Diesel Range Organics

**TABLE 7 Continued**

Monitoring Well / Boring Number	Number of samples	Approximate sample depth	Sample matrix	Analytical Methods	No. QC duplicates, method	No. of rinsate blanks, Method
B2	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP	1 Barium EPA 700 Barium TCLP	1 Barium EPA 700 Barium TCLP
B3	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP	1 Barium EPA 700 Barium TCLP	
B4	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP		
B5	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP		
B6	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP		
B7	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP		

Note: TPH-DRO -- Total Petroleum Hydrocarbons -- Diesel Range Organics

**TABLE 7 Continued**

Monitoring Well / Boring Number	Number of samples	Approximate sample depth	Sample matrix	Analytical Methods	No. QC duplicates, method	No. of rinsate blanks, Method
B8	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP		
B9	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP		
B10	2 Samples depths to be selected randomly	Between 0-5 feet	Soil	Barium EPA 700 Barium TCLP		

Note: TPH-DRO – Total Petroleum Hydrocarbons – Diesel Range Organics

Draft

**TABLE 8**

SAMPLE CONTAINERS, ANALYTICAL METHODS, PRESERVATIVES, AND HOLDING TIMES  
BELAUSTEGUI PARK, BATTLE MOUNTAIN, NEVADA

SOIL

Analyte	Container	Analytical Method	Preservative	Holding Time
Soluble Barium	One brass liner filled completely.	TCLP Extraction by EPA 1311	Store at 4°C	6 months
Total Barium	One brass liner filled completely.	EPA 700	Store at 4°C	6 months
VOCs	One Encore sampler sealed in a ziploc bag.	SWEPA Method 8260	Store at 4°C	14 days
TPH-DRO & TPH-GRO	One brass liner filled completely.	SWEPA Method 8015B	Store at 4°C	14 days

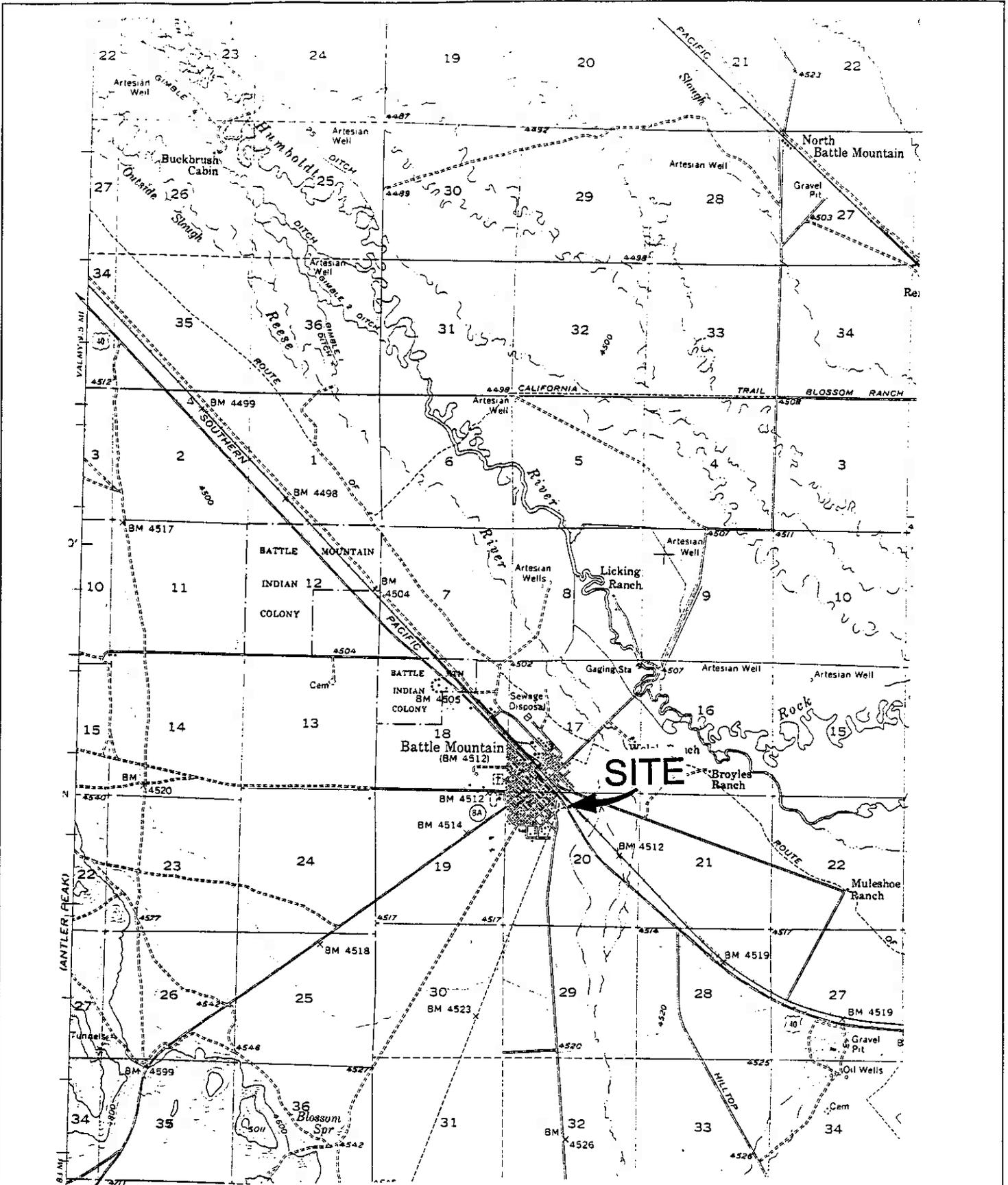
GROUNDWATER

Analyte	Container	Analytical Method	Preservative	Holding Time
VOCs	Three 40-ml vials with Teflon lined septa, filled completely.	SWEPA Method 8260	HCl to pH <2 Store at 4°C	14 days
TPH-DRO	One 1-L amber glass bottle with Teflon-lined lids.	SWEPA Method 8015B	Store at 4°C	14 days
TPH-GRO	Three 40-ml vials with Teflon lined septa, filled completely.	SWEPA Method 8015B	Store at 4°C	14 days

Notes:

- TPH-DRO = Total petroleum hydrocarbons – diesel range organics
- TPH-GRO = Total petroleum hydrocarbons – gasoline range organics
- VOC – Volatile Organic Compounds

**PLATES**



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**SITE LOCATION MAP**

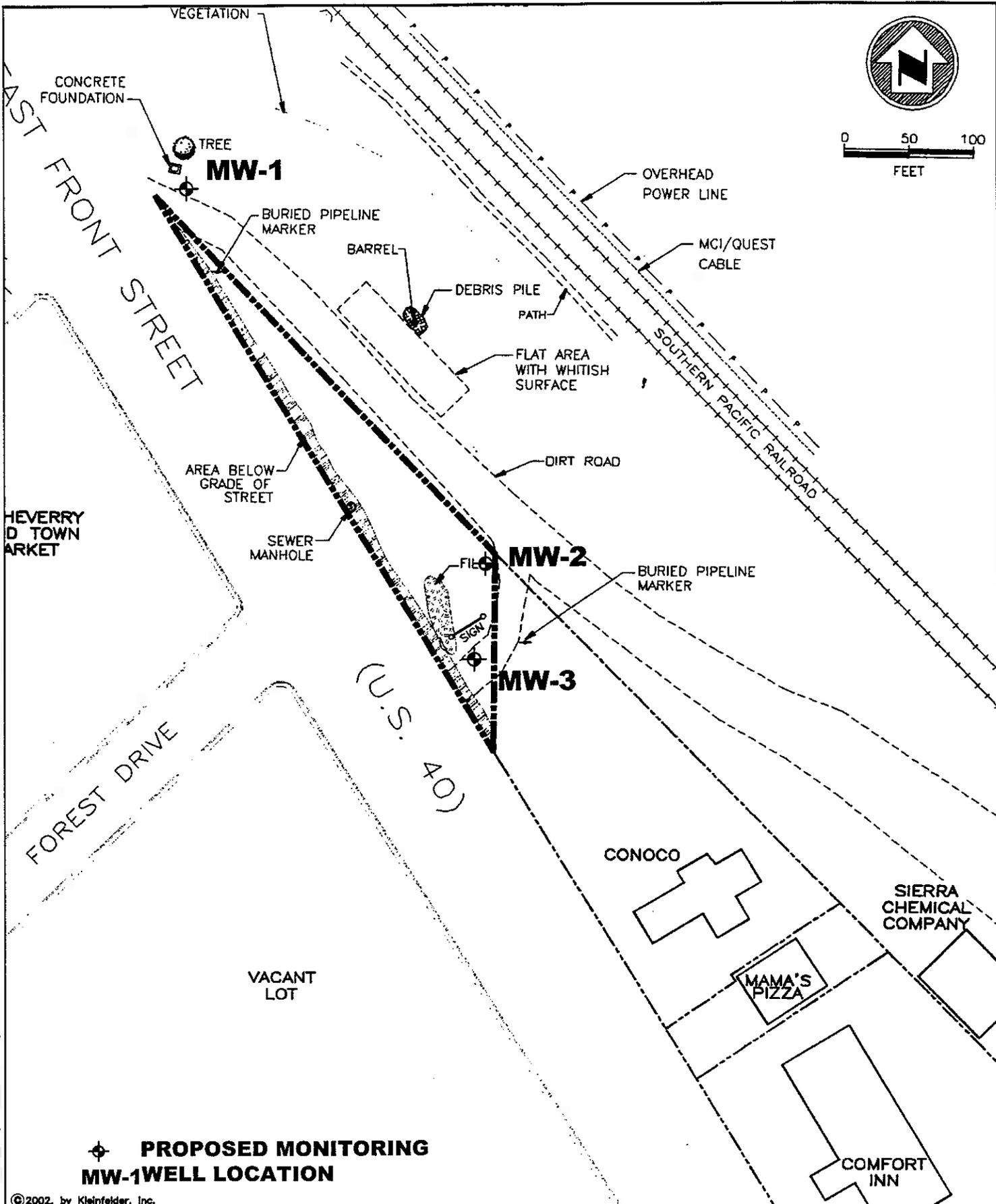
BELAUSTEGUI PARK  
 BATTLE MOUNTAIN, NEVADA

PLATE

**1**

PROJECT NO. 15562.01

DRAFT 15562-SITE



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**SITE VICINITY MAP SHOWING  
MONITORING WELL LOCATIONS**

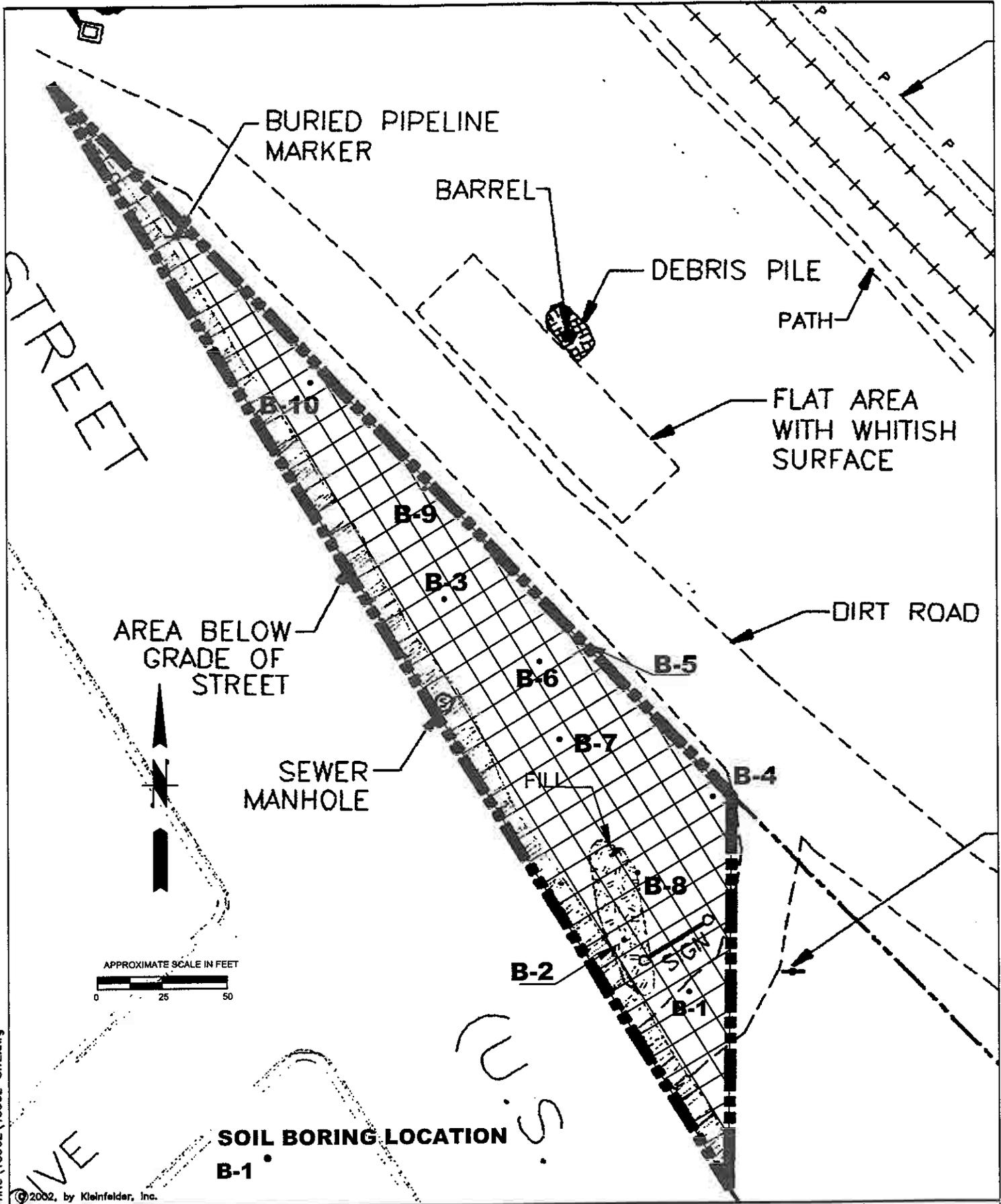
BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA

PLATE

**2**

PROJECT NO. 15562.01

FTING 2\15' (E.dwg)  
 CAD 2\20'



L:\20...AFTINL...32\B...JTE.dwg

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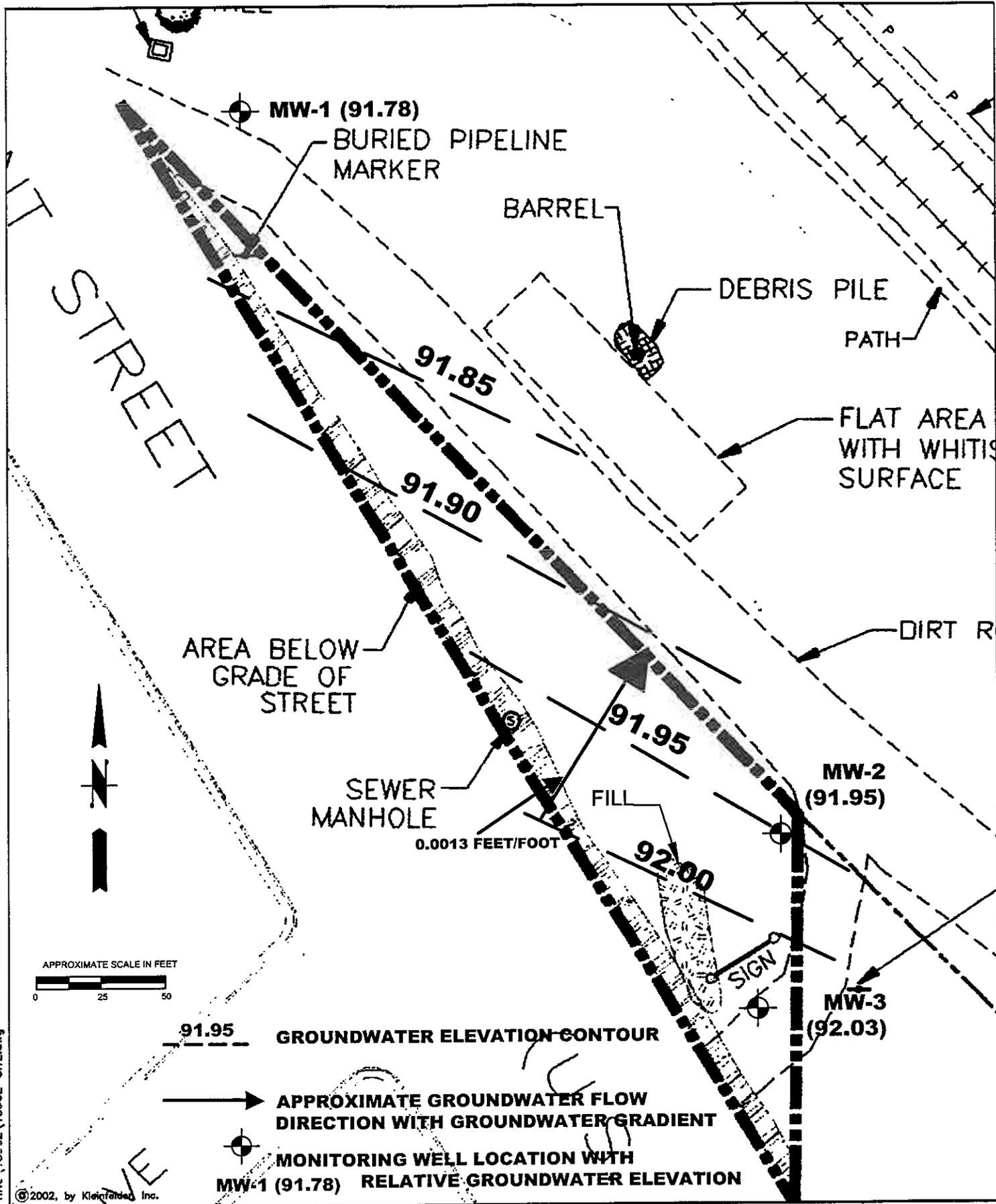
**MONITORING WELL AND  
 SOIL BORING LOCATION MAP**

BELAUSTEGUI PARK  
 BATTLE MOUNTAIN, NEVADA

PLATE

**3**

PROJECT NO. 15562.01



CAD L:\20\AFTINK\32\15\...JTE.dwg  
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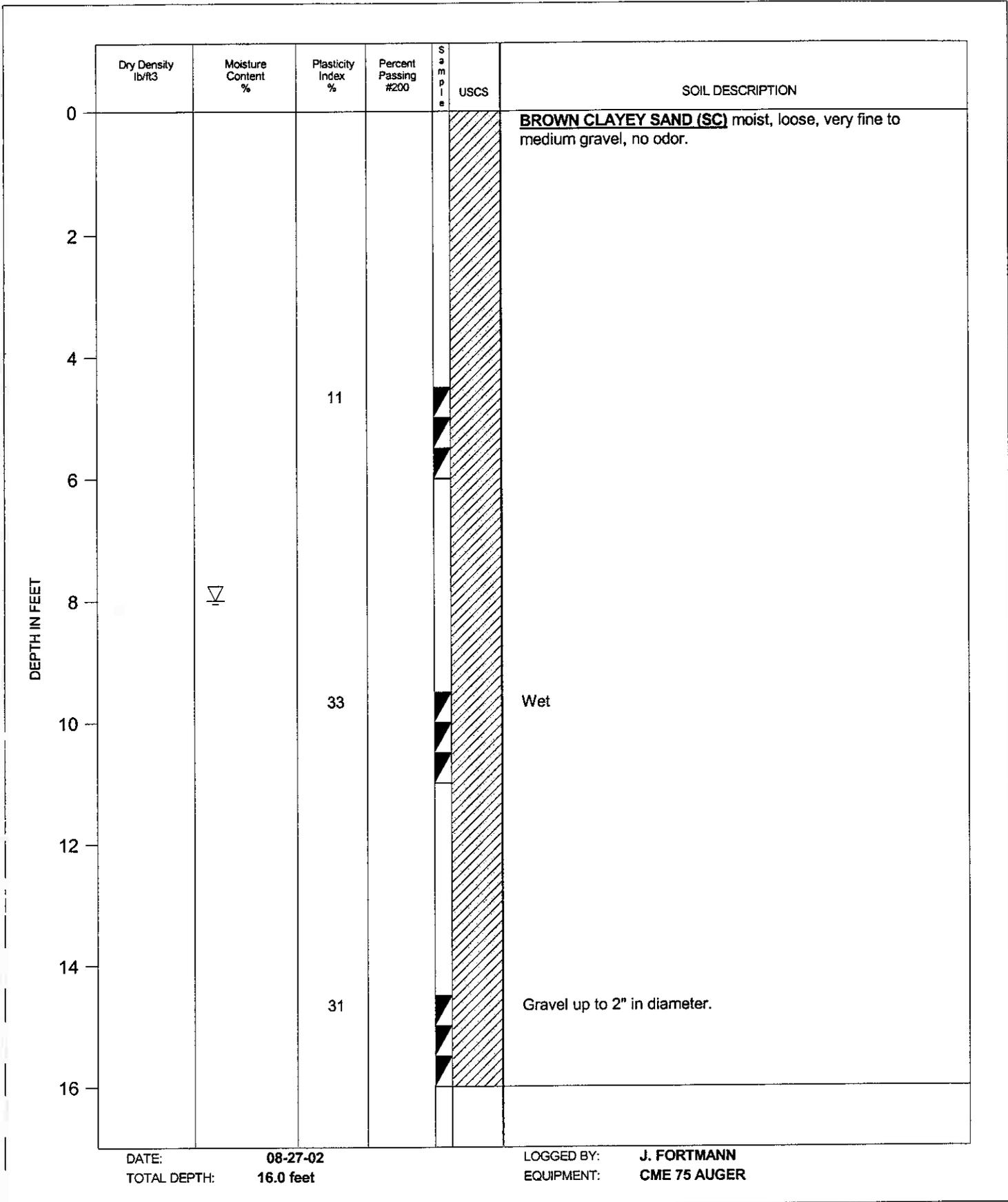
**GROUNDWATER ELEVATION MAP**

BELAUSTEGUI PARK  
 BATTLE MOUNTAIN, NEVADA

PLATE  
**4**

**APPENDIX A**

**Boring Logs**



**KLEINFELDER**

PROJECT NO 15562.01

**BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA**

LOG OF MW-1

PLATE

**1**

DEPTH IN FEET	Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	Sample	USCS	SOIL DESCRIPTION
	0						
2							
4			28				
6		▽					
8							
10							
12							
14							
16							Wet

DATE: 08-27-02  
TOTAL DEPTH: 16.0 feet

LOGGED BY: J. FORTMANN  
EQUIPMENT: CME 75 AUGER



BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA

PLATE  
**2**

DEPTH IN FEET	Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
	0						
2							
4							
6							
8		▽					
10			23				Wet, more gravel
12							
14							
16							Wet

DATE: 08-27-02  
TOTAL DEPTH: 16.0 feet

LOGGED BY: J. FORTMANN  
EQUIPMENT: CME 75 AUGER



**KLEINFELDER**

BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA

PLATE

**3**

DEPTH IN FEET

Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
						<b>LIGHT BROWN SILTY SAND (SM)</b> dry, medium dense, very fine to 3" in diameter gravel.
						No free water encountered.

DATE: 08-26-02  
TOTAL DEPTH: 6.0 feet

LOGGED BY: J. FORTMANN  
EQUIPMENT: CME 75 AUGER



**KLEINFELDER**

BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA

PLATE

**4**

DEPTH IN FEET	Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
	0						
2							
4							
6							No free water encountered.
8							
10							
12							
14							
16							
DATE: 08-26-02		LOGGED BY: J. FORTMANN					
TOTAL DEPTH: 5.0 feet		EQUIPMENT: CME 75 AUGER					



**KLEINFELDER**

BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA

PLATE

**5**

PROJECT NO. 15562.01

LOG OF B-2

DEPTH IN FEET	Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	Sample	USCS	SOIL DESCRIPTION
	0						
2							
4							
6							No free water encountered.
8							
10							
12							
14							
16							

DATE: 08-27-02  
TOTAL DEPTH: 6.0 feet

LOGGED BY: J. FORTMANN  
EQUIPMENT: CME 75 AUGER



**KLEINFELDER**

**BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA**

PLATE

**6**

DEPTH IN FEET	Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
	0						
2							
4							<b>BROWN SILTY SAND (SM)</b> moist, medium dense, very fine to fine gravel, no odor.
6							No free water encountered.
8							
10							
12							
14							
16							

DATE: 08-28-02  
TOTAL DEPTH: 4.5 feet

LOGGED BY: J. FORTMANN  
EQUIPMENT: CME 75 AUGER



**KLEINFELDER**

BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA

PLATE

**7**

DEPTH IN FEET

Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
						<b>BROWN SILTY SAND (SM)</b> dry, medium dense, very fine to medium sand, no odor.
						<b>BROWN SILTY SAND (SM)</b> moist, medium dense, very fine to medium gravel, no odor.
						No free water encountered.

DATE: 08-28-02  
 TOTAL DEPTH: 5.0 feet

LOGGED BY: J. FORTMANN  
 EQUIPMENT: CME 75 AUGER



KLEINFELDER

PROJECT NO. 15562.01

BELAUSTEGUI PARK  
 BATTLE MOUNTAIN, NEVADA

LOG OF B-5

PLATE

8

DEPTH IN FEET

Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
						<b>LIGHT BROWN SILTY SAND (SM)</b> dry, medium dense, very fine to fine sand.
						<b>BROWN SILTY SAND (SM)</b> dry, medium dense, very fine to fine gravel, no odor.
						Wet
						No free water encountered.

DATE: 08-28-02  
 TOTAL DEPTH: 5.0 feet

LOGGED BY: J. FORTMANN  
 EQUIPMENT: CME 75 AUGER



**KLEINFELDER**

BELAUSTEGUI PARK  
 BATTLE MOUNTAIN, NEVADA

PLATE

**9**

PROJECT NO. 15562.01

LOG OF B-6

DEPTH IN FEET	Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
							0
2							
4							Less silt Wet
6							No free water encountered.
8							
10							
12							
14							
16							

DATE: 08-28-02  
TOTAL DEPTH: 5.5 feet

LOGGED BY: J. FORTMANN  
EQUIPMENT: CME 75 AUGER



**KLEINFELDER**

BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA

PLATE

**10**

DEPTH IN FEET

Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
						<b>BROWN SILTY SAND (SM)</b> moist, medium dense, very fine to medium gravel, no odor.
						Wet
						No free water encountered.

DATE: 08-28-02  
 TOTAL DEPTH: 4.5 feet

LOGGED BY: J. FORTMANN  
 EQUIPMENT: CME 75 AUGER



**KLEINFELDER**

PROJECT NO. 15562.01

**BELAUSTEGUI PARK  
 BATTLE MOUNTAIN, NEVADA**

LOG OF B-8

PLATE

**11**

DEPTH IN FEET

Dry Density lb/ft <sup>3</sup>	Moisture Content %	Plasticity Index %	Percent Passing #200	Sample	USCS	SOIL DESCRIPTION
						<b>BROWN SILTY SAND (SM)</b> dry, medium dense, very fine to fine sand.
						Very fine to fine gravel
						No free water encountered.

DATE: 08-28-02  
 TOTAL DEPTH: 4.0 feet

LOGGED BY: J. FORTMANN  
 EQUIPMENT: CME 75 AUGER



**KLEINFELDER**

BELAUSTEGUI PARK  
 BATTLE MOUNTAIN, NEVADA

PLATE

**12**

PROJECT NO. 15562.01

LOG OF B-9

DEPTH IN FEET	Dry Density lb/R3	Moisture Content %	Plasticity Index %	Percent Passing #200	S a m p l e	USCS	SOIL DESCRIPTION
	0						
2							Moist, very fine to fine gravel
4							No free water encountered.
6							
8							
10							
12							
14							
16							
DATE: 08-28-02		LOGGED BY: J. FORTMANN		EQUIPMENT: CME 75 AUGER			
TOTAL DEPTH: 3.0 feet							



**KLEINFELDER**

BELAUSTEGUI PARK  
BATTLE MOUNTAIN, NEVADA

PLATE

**13**

PROJECT NO. 15562.01

LOG OF B-10

**APPENDIX B**

**Field Forms**

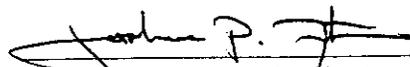
# Daily Field Report (DFR)

Project Name BELANSTEGUI AARK Project No. 15562.01 Date 8-26-02  
 Project Location BATTLE MTN, NV Time Arrived 1230  
 Contractor BOAT LONGYEAR Technician \_\_\_\_\_ Time Departed 1800  
 Weather SUNNY Travel Time \_\_\_\_\_  
 Earthwork Equipment Observed DRILL RIG Mileage \_\_\_\_\_  
 DFR Given to (or left at) \_\_\_\_\_ DFR No. 1  
 Reviewed by \_\_\_\_\_ Date Reviewed \_\_\_\_\_

Observations/Remarks:

1230 ARRIVE ONSITE  
 1250 DRILLERS ARRIVE ONSITE. ROBERT SOLOIS (DRILLER) AND SHAWNE MARTINEZ (HELPER) WITH BOAT LONGYEAR  
 1300 START FILLING H<sub>2</sub>O TANK.  
 1310 HEALTH AND SAFETY MEETING HELD. JOSH FORTMANN (KA) AND ROBERT AND SHAWNE IN ATTENDANCE.  
 1340 START BORING-1.  
 1350 DRILL RIG DOWN, REPAIRING AUTO-HAMMER.  
 1435 RESTART DRILLING B-1  
 1500 DRILL RIG DOWN, AUTO HAMMER BREAK. COTTER PIN IN HAMMER DRIVE CHAIN BROKEN.  
 1540 DRILL RIG REPAIRED, CONTINUE B-1.  
 1550 COMPLETE B-1. COLLECT RB-W-1 (RINSATERBLANK).  
 1600 MOB TO B-2.  
 1610 START DRILLING B-2  
 1615 DRILL RIG DOWN.  
 1725 DRILL RIG REPAIRED, CONTINUE DRILLING B-2.  
 1800 COMPLETE DRILLING B-2. DRILLER PERFORMING WORK ON DRILL RIG.

NOTE: Observations, pass/fail evaluations, and/or recommendations (if applicable) provided herein have not been reviewed by an engineer and, therefore, should be considered preliminary and subject to change.

  
 Kleinfelder Representative Signature

JOSHUA P. FORTMANN  
 Kleinfelder Representative Print Name

# Daily Field Report (DFR)

Project Name BELAUSTEGUI PARK Project No. 13962.01 Date 8-27-02  
 Project Location BATTLE MOUNTAIN, NV Time Arrived 0700  
 Contractor BOART LONGYEAR Technician \_\_\_\_\_ Time Departed 1850  
 Weather SUNNY Travel Time \_\_\_\_\_  
 Earthwork Equipment Observed DRILL RIG Mileage \_\_\_\_\_  
 DFR Given to (or left at) \_\_\_\_\_ DFR No. 2  
 Reviewed by \_\_\_\_\_ Date Reviewed \_\_\_\_\_

Observations/Remarks:

0700 ARRIVE ONSITE  
 0720 START DRILLING MW-2.  
 0800 COMPLETE DRILLING MW-2, TO 15' BGS. NO PID READINGS > 0 FOR ALL SOIL SAMPLES FROM MW-2.  
 0815 START DRILLING MW-1.  
 0910 COMPLETE DRILLING MW-1.  
 0925 START DRILLING MW-3. NO PID READINGS > 0 FOR ALL SOIL SAMPLES FROM MW-1.  
 1010 COMPLETE DRILLING MW-3. NO PID READINGS > 0 FOR ALL SOIL SAMPLES FROM MW-3.  
 1045 CONNIE LEWIS ARRIVES ONSITE. MW-3 CONSTRUCTION ONGOING.  
 1200 COMPLETE MW-3 CONSTRUCTION.  
 1210 START CONSTRUCTING MW-2 1215 CONNIE LEWIS DEPARTS SITE.  
 1300 COMPLETE CONSTRUCTING MW-2 1315 START CONSTRUCTING MW-1  
 1400 COMPLETE MW-1 CONSTRUCTION  
 1445 UPS PICKS UP SOIL SAMPLES.  
 1455 START BORING B-3.  
 1520 BORING 3 DRILLING ONGOING. SLOW DUE TO AUTO-HAMMER.  
 1525 DRILL RIG DOWN. START MW-1 DEVELOPMENT.  
 1800 DRILL RIG STILL DOWN. MW-1 DEVELOPMENT COMPLETE.  
 1830 DRILL RIG OPERATIONAL. CHRISTY BOXES INSTALLED AT MW-1, 2 + 3.

NOTE: Observations, pass/fail evaluations, and/or recommendations (if applicable) provided herein have not been reviewed by an engineer and, therefore, should be considered preliminary and subject to change.

  
 Kleinfelder Representative Signature

JOSHUA P. FORTMANN  
 Kleinfelder Representative Print Name

# Daily Field Report (DFR)

Project Name BELANSTEGUI PARK Project No. 15562.01 Date 8-28-02  
Project Location BATTLE MOUNTAIN, NV Time Arrived 0700  
Contractor BOART LONGYEAR Technician \_\_\_\_\_ Time Departed 1300  
Weather SNY Travel Time \_\_\_\_\_  
Earthwork Equipment Observed DRILL RIG Mileage \_\_\_\_\_  
DFR Given to (or left at) \_\_\_\_\_ DFR No. 3  
Reviewed by \_\_\_\_\_ Date Reviewed \_\_\_\_\_

Observations/Remarks:

0700 ARRIVE ONSITE.  
0725 START BORING B-4.  
0745 COMPLETE BORING B-4.  
0780 START BORING B-5.  
0807 COMPLETE DRILLING B-5.  
0815 START BORING B-6.  
0835 COMPLETE BORING B-6.  
0845 START BORING B-7.  
0905 COMPLETE B-7.  
0910 START B-8.  
0930 COMPLETE B-8.  
0940 START B-9.  
0950 COMPLETE B-9.  
0955 START B-10.  
1005 COMPLETE B-10.  
1045 PERFORM WELL CASING ELEVATION SURVEY. DRILLERS  
DEPART SITE. START MW-2 WELL DEVELOPMENT.  
1215 COMPLETE MW-2 WELL DEVELOPMENT, START MW-3  
DEVELOPMENT.  
1245 COMPLETE MW-3 DEVELOPMENT.  
1300 DEPART SITE.

NOTE: Observations, pass/fail evaluations, and/or recommendations (if applicable) provided herein have not been reviewed by an engineer and, therefore, should be considered preliminary and subject to change.

  
Kleinfelder Representative Signature

Jessica P. Fortmann  
Kleinfelder Representative Print Name

## MONITORING WELL SAMPLE RECORD

Project Name: BELMONT STEGNI PARK  
 Project No.: 15562-01  
 Date: 9-3-02  
 Monitor Well No: NW-3 Observer(s): FORTMAN  
 Casing Diameter: 2" Floating Product Thickness: NONE OBSERVED  
 Depth to Water Before Sampling: 7.57' at 1440 hrs. measured from: TOP OF CASING  
 Depth to Water After Sampling:      at      hrs. measured after      min. recovery.  
 Total Depth of Well: 14.50' from same monitor point as DTW.  
 TD-DTW = 7.23 feet of water.

Total gallons of water in one well volume = 1.18 gallons.

Bailer/pump depth      + volumes = 4.72 gallons.

Time	Totalizer Reading	Volume Purged (gals)	Actual Flow Rate (gpm)	pH	T (°C)	EC*	Color	Odor
1446		1		6.68	78.79	5670.5	BRN	ND
1450		2		7.40	73.9	5860	"	"
1451		3		7.57	72.4	5800	"	"
1453		4		7.60	71.4	5890	"	"
1455		4.75		7.55	69.2	5800	"	"

\*EC = Specified Conductance in Micromhos/cm

Time Sampled:	<u>1457</u>				
Sample Number(s):	<u>MW3-GW-1</u>				
Purge Device:	<u>BAILER</u>				
Sample Device:	<u>BAILER</u>				

Weather: SUNNY, WINDY

Additional Notes: COLLECTED QC DUPLICATES AT 1457. COLLECTED  
FIELD BLANK AT 1517 (FB-W-1)      D (MW3-GW-2)

## MONITORING WELL SAMPLE RECORD

Project Name: DELAUSSEGNI AREA  
 Project No.: 15562.01  
 Date: 9-3-02

Monitor Well No: MW-1 Observer(s): FORTMANN  
 Casing Diameter: 2" Floating Product Thickness: NONE OBSERVED  
 Depth to Water Before Sampling: 8.22' at 1358 hrs. measured from: DD OF CASING  
 Depth to Water After Sampling: \_\_\_\_\_ at \_\_\_\_\_ hrs. measured after \_\_\_\_\_ min. recovery.  
 Total Depth of Well: 15.01 from same monitor point as DTW.

TD-DTW = 6.79 feet of water.

Total gallons of water in one well volume = 1.11 gallons.

Bailer/pump depth \_\_\_\_\_ 4 volumes = 4.44 gallons.

Time	Totalizer Reading	Volume Purged (gals)	Actual Flow Rate (gpm)	pH	T (°C)	EC*	Color	Odor
1405		1		7.29	80.9°P	5690NS	CLDY	ND
1408		2		7.80	74.3	5760	"	"
1410		3		7.93	73.2	5710	"	"
1412		4.5		7.79	73.0	5670	"	"

\*EC = Specified Conductance in Micromhos/cm

Time Sampled:	<u>1415</u>			
Sample Number(s):	<u>MW1-GW-1</u>			
Purge Device:	<u>BAILER</u>			
Sample Device:	<u>BAILER</u>			

Weather: SUNNY, WINDY  
 Additional Notes: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## MONITORING WELL SAMPLE RECORD

Project Name: BELANSTEGNI PARK  
 Project No.: 15562.01  
 Date: 9-3-02

Monitor Well No: MW-2 Observer(s): FORTMANN  
 Casing Diameter: 2" Floating Product Thickness: NONE OBSERVED

Depth to Water Before Sampling: 5.20' at 1228 hrs. measured from: TOP OF CASING

Depth to Water After Sampling: \_\_\_\_\_ at \_\_\_\_\_ hrs. measured after \_\_\_\_\_ min. recovery.

Total Depth of Well: 15.40' from same monitor point as DTW.

TD-DTW = 10.2 feet of water.

Total gallons of water in one well volume = 1.66 gallons.

Bailer/pump depth \_\_\_\_\_ 4 volumes = 6.64 gallons.

Time	Totalizer Reading	Volume Purged (gals)	Actual Flow Rate (gpm)	pH	T (°C)	EC*	Color	Odor
1301		2		7.18	80.6°F	5710 <sub>µS</sub>	BRN	ND
1315		4		7.85	75.8	5610	CLDY	ND
1319		5		8.20	73.6	5520	"	"
1331		6		8.24	74.5	5610	"	"

\*EC = Specified Conductance in Micromhos/cm

Time Sampled:	1335			
Sample Number(s):	MW2-GW-1			
Purge Device:	BAILER			
Sample Device:	BAILER			

Weather: SNUNNY, WINDY

Additional Notes: BAILER DRY AFTER ~ 3.6 GALLONS PURGED; AT 1304 ALLOW ~ 8 MIN RECHARGE BAILER DRY AFTER ~ 5 GALLONS AT 1320



KLEINFELDER  
SAMPLE CONTROL LOG

Project Name: BELAUSTEQUO PARK

Project Number: 15562.01

Date: 8-27-02

Time	Date	Field Sample Number	Sample Location	Matrix (soil, water)	No. of Containers	Container Size	Material (glass, plastic)	Preserved/Unpreserved (preservative)	Filtered/Unfiltered	Notes
0730	8-27-02	MW2-S-5-1	MW-2	SOIL	1 BRASS 3 ENCORE	—	—	—	—	5' BGS NO ODOR, PID=0
0745	8-27-02	MW2-S-10-2	"	"	1 BRASS	—	—	—	—	10' BGS NO ODOR, PID=0
0800	"	MW2-S-15-3	"	"	"	—	—	—	—	15' BGS NO ODOR, PID=0
0834	"	MW1-S-5-1	MW-1	"	1 BRASS 3 ENCORE	—	—	—	—	5' BGS NO ODOR, PID=0
0848	"	MW1-S-10-2	"	"	1 BRASS	—	—	—	—	10' BGS NO ODOR, PID=0
0855	"	MW1-S-15-3	"	"	"	—	—	—	—	15' BGS NO ODOR, PID=0
0935	"	MW3-S-5-1	MW-3	"	1 BRASS 3 ENCORE	—	—	—	—	5' BGS NO ODOR, PID=0
0946	"	MW3-S-10-2	"	"	1 BRASS	—	—	—	—	10' BGS NO ODOR, PID=0
0955	"	MW3-S-15-3	"	"	"	—	—	—	—	15' BGS NO ODOR, PID=0
0940	"	MW3-S-5-2	"	"	3 ENCORE	—	—	—	—	QC, DUPLICATE
1501	"	B3-S-1-1	Boring 3	"	1 BRASS	—	—	—	—	1' BGS
1850	"	B3-S-5-2	"	"	"	—	—	—	—	5' BGS
1501	"	B3-S-1-2	"	"	"	—	—	—	—	1' BGS
0765	8-27-02	RD-W-2	MW-1	H <sub>2</sub> O	3 VOR 2 L	40 mL 1 L	GLASS	3 HCl ZUP	UNF	

KLEINFELDER  
SAMPLE CONTROL LOG

Project Name: BEAUSIEGUI PAV

Project Number: 15562.01

Date: 8-28-02

Time	Date	Field Sample Number	Sample Location	Matrix (soil, water)	No. of Containers	Container Size	Material (glass, plastic)	Preserved/Unpreserved (preservative)	Filtered/Unfiltered	Notes
0732	8-28-02	B4-S-3-1	B-4	SOIL	1	250mL	PLASTIC	—	—	3' BGS NO ODOUR
0735	"	B4-S-4-2	B-4	"	"	"	"	—	—	4' BGS NO ODOUR
0755	"	B5-S-3-1	B-5	"	"	"	"	—	—	3' BGS NO ODOUR
0800	"	B5-S-3-2	"	"	"	"	"	—	—	3' BGS NO ODOUR
0805	"	B5-S-4-3	"	"	"	"	"	—	—	4' BGS NO ODOUR
0825	"	B6-S-2-1	B-6	"	"	"	"	—	—	2' BGS NO ODOUR
0830	"	B6-S-4-2	"	"	"	"	"	—	—	4' BGS NO ODOUR
0850	"	B7-S-3-1	B-7	"	"	"	"	—	—	3' BGS NO ODOUR
0900	"	B7-S-5-2	B-7	"	"	"	"	—	—	5' BGS NO ODOUR
0920	"	B8-S-2-1	B-8	"	"	"	"	—	—	2' BGS NO ODOUR
0925	"	B8-S-3-2	B-8	"	"	"	"	—	—	3' BGS NO ODOUR
0940	"	B9-S-0-1	B-9	"	"	"	"	—	—	0' BGS NO ODOUR
0946	"	B9-S-3-2	B-9	"	"	"	"	—	—	3' BGS NO ODOUR
0950	"	B10-S-1-1	B-10	"	"	"	"	—	—	1' BGS NO ODOUR
1000	"	B10-S-2-2	"	"	"	"	"	—	—	2' BGS NO ODOUR

JAF







KLEINFELDER

WELL DEVELOPMENT LOG

Well # MAN-1

Time	1832	1836	1844	1849	1855
Gallons Purged	3.0	5.0	7.0	9.0	10.5
Purge Rate					
pH	7.16	7.60	7.81	7.90	7.97
Conductivity (umho/cm)	525	539	548	545	544
Temperature (°F)	77.7	74.4	72.1	71.5	70.9
Salinity (0/00)					
Water Level	STATIC 8.20'				
Dewatered	3 GALLONS	5 GALLONS	7 GAL	9 GAL	
Turbidity					
Color	BROWN	CLOUDY	CLOUDY	CLEAR	CLEAR
Comments	No odor	No odor	CLARITY INCREASING No odor	No odor	No odor

Project # 13362.01 Project Name B.P.M.K. Total Depth 15.05'

Date 8/27/02 Initials SE Screen Interval 5-15'



KLEINFELDER

WELL DEVELOPMENT LOG

Well # MW-2

Time	1105	1121	1127	1137	1146	1158	1214
Gallons Purged	1	3.5	4.0	5.0	6.0	7.0	9.0
Purge Rate							
pH		6.98	7.88	8.14	8.22	8.25	8.26
Conductivity (µmhos/cm)		5380	5350	5340	5340	5370	5380
Temperature (°C) °F		74.9°F	72.1	71.7	71.8	71.4	73.6
Salinity (0/00)							
Water Level	STATIC 5.14'						
Dewatered	✓	✓	✓	✓	✓	✓	✓
Turbidity							
Color	BROWN	CLOUDY	CLOUDY	CLEAR	CLEAR	CLEAR	CLEAR
Comments	NO ODOR						↑

Project # 15562.01 Project Name B. PARK Total Depth 14.40'

Date 8/28/02 Initials JF Screen Interval 5-15'



KLEINFELDER

WELL DEVELOPMENT LOG

Well # MW-3

Time	1228	1232	1234	1235	1236	1245	1246
Gallons Purged	4.0	6.0	8.0	10.0	13.0	25.0	28.0
Purge Rate							
pH	6.89	7.66	7.76	8.06	7.97	8.26	8.18
Conductivity (umho/cm)	4350	5140	5260	5620	5650	6220	6190
Temperature (°F)	74.9	71.3	71.0	70.9	70.7	71.5	71.1
Salinity (0/00)							
Water Level	STATIC 7.56						
Dewatered							
Turbidity							
Color	BROWN	BROWN	CLOUDY	CLOUDY	CLOUDY	CLEAR	CLEAR
Comments	No odor						↑

Project # 1356201 Project Name B.Park Total Depth 14.55'

Date 8/20/02 Initials SP Screen Interval 25-15'

# KLEINFELDER

PROJECT NO. 15512.01		PROJECT NAME DELANETEGNI PARK		RECEIVING LAB: CFA REGION 9 LABORATORY	
LP NO. (P.O. NO.)		SAMPLERS: (Signature/Number)		INSTRUCTIONS/REMARKS	
DATE MM/DD/YY	SAMPLE ID. HH-MM-SS	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS
1/21/02	0920	PA-S-2-1	SOIL	1	
2/20/02	0925	PA-S-2-2	SOIL	1	
3/28/02	0910	PA-S-0-1	SOIL	1	
4/25/02	0910	PA-S-2-2	SOIL	1	
5/13/02	0920	PA-S-1-1	SOIL	1	
6/10/02	1000	PA-S-2-2	SOIL	1	
7/22/02	0920				
8/26/02	1412	RB-W-1	WATER	1	
9/27/02	0905	RB-W-2	WATER	3	
10/2/02	0835	RB-W-3	WATER	1	
11					
12					
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ANALYSIS  
 TML 2A (70)  
 TML 2B (131)  
 TML 2C (131)  
 TML 2D (131)  
 TML 2E (131)  
 TML 2F (131)

Instructions/Remarks:  
 CASE # R025830

Relinquished by: (Signature) \_\_\_\_\_ Date/Time 1/29/02 1310  
 Received by: (Signature) \_\_\_\_\_  
 Relinquished by: (Signature) \_\_\_\_\_ Date/Time \_\_\_\_\_  
 Received by: (Signature) \_\_\_\_\_  
 Relinquished by: (Signature) \_\_\_\_\_ Date/Time \_\_\_\_\_  
 Received for Laboratory by: (Signature) \_\_\_\_\_

Send Results To:  
 KLEINFELDER  
 3189 MILL STREET  
 RENO, NV 89502  
 (702) 323-7182

# KLEINFELDER

PROJECT NO.		PROJECT NAME		RECEIVING LAB:		
15562.01		ECLAUSTEGUI PARK		EPA REGION 7 LABORATORY		
L.P. NO. (P.O. NO.)		SAMPLERS: (Signature/Number)		INSTRUCTIONS/REMARKS		
		<i>John J. [Signature]</i>				
DATE	SAMPLE ID. HH-MM-SS	SAMPLE ID.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS
8/27/02	0730	MW2-S-5-1	SOIL	1		X
8/27/02	0824	MW1-S-5-1	SOIL	1		X
8/27/02	0925	MW2-S-5-1	SOIL	1		X
8/27/02	0935	MW3-S-5-2	SOIL	1		X
8/27/02	1501	B3-S-1-1	SOIL	1		X
8/27/02	1501	B2-S-1-2	SOIL	1		X
8/27/02	1850	B3-S-5-2	SOIL	1		X
8/26/02	1731	B2-S-1-1	SOIL	1		X
8/26/02	1731	B2-S-1-2	SOIL	1		X
8/26/02	1745	B2-S-4-3	SOIL	1		X
8/26/02	0732	B4-S-3-1	SOIL	1		X
8/26/02	0735	B4-S-4-2	SOIL	1		X
8/26/02	0755	B5-S-3-1	SOIL	1		X
8/26/02	0805 <sup>MF</sup>	B5-S-4-3	SOIL	1		X
8/26/02	1550	B1-S-2-1	SOIL	1		X
8/26/02	1556	B1-S-5-2	SOIL	1		X
8/26/02	0825	B6-S-2-1	SOIL	1		X
8/26/02	0830	B6-S-4-2	SOIL	1		X
8/26/02	0850	B7-S-3-1	SOIL	1		X
8/26/02	0900	B7-S-5-2	SOIL	1		X
				TOTAL B (700)		X
				TOTAL B (815)		X
				TOTAL B (1211)		X

Send Results To:  
**KLEINFELDER**  
 3189 MILL STREET  
 RENO, NV 89502  
 (702) 323-7182

Attn:

Instructions/Remarks:  
**CASE # R02580**

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
<i>John J. [Signature]</i>	8/29/02 1510	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)



**APPENDIX C**

**Analytical Results and  
Chains of Custody**

**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP (SDG):** 02242B  
**PROGRAM:** Superfund  
**DOCUMENT CONTROL #:** B0101126-1983  
**ANALYSIS PERFORMED:** Total Petroleum Hydrocarbons-Diesel  
Range Organics (TPH-DRO)  
**DATE :** September 25, 2002

**SAMPLE NUMBERS:**

<u>Client Sample No.</u>	<u>Laboratory Sample ID</u>	<u>Client Sample No.</u>	<u>Laboratory Sample ID</u>
RB-W-2	AB36606	MW3-GW-1	AB36642
MW1-GW-1	AB36640	MW3-GW-2	AB36643
MW2-GW-1	AB36641	FB-W-1	AB36644

**GENERAL COMMENTS**

Six (6) water samples were received at the EPA Region 9 Laboratory on 08/30/02 and 09/05/02 from the Belavstegui Park site for determination of TPH-DRO.

The samples were analyzed for TPH-DRO in accordance with the Region 9 Laboratory SOP 385, *Extractable Petroleum Hydrocarbons by GC FID* based on EPA SW-846 Method 8015B, *Nonhalogenated Organics Using GC/FID*, Revision 2, December 1996 and Region 9 Laboratory SOP 275, *Extraction of Petroleum Hydrocarbons from Water Using Continuous Liquid-Liquid Extraction* based on EPA SW-846 Method 3520C, *Continuous Liquid-Liquid Extraction*, Revision 3, December 1996.

The laboratory chose a QC sample at random because none was designated by the field samplers on the chain-of-custody forms.

**SAMPLE RECEIPT AND PRESERVATION**

No shipping or preservation issues were encountered with these samples.

**QA/QC AND ANALYTICAL COMMENTS**

The following comments appear on the Summary of Analytical Results:

1. The sample listed below was extracted on 9/9/02. Results from the original extraction revealed low surrogate recoveries. The sample was re-extracted on 09/16/02 beyond holding time. Surrogate recoveries for the re-extraction were within the QC limits; therefore, quantitation limit for the sample is estimated and "J" flagged.

Sample ID	Lab ID	Date Collected	Holding Time Date	Date Extracted	Days Beyond
MW3-GW-2	AB36643	09/03/02	09/10/02	09/16/02	6

2. The surrogate listed below does not meet the QC limit. The sample was re-extracted on 09/16/02 and re-analyzed (data files: 255ZM007 and 263Z019). According to the extraction data sheet, this sample was dark in color after concentration. Low surrogate recoveries were noted for the re-extracted sample. Detected result for the analyte in the sample listed below is estimated and "J" flagged.

Sample ID	Lab ID	Surrogate	% Rec	QC Limit
MW3-GW-1	AB36642	n-Hexacosane	68	70 - 130

The following QC results are associated with the samples in this SDG

QC limits were met for all initial calibration, CVs, QCS percent differences, surrogate percent recoveries, LFB percent recoveries, LFM/LFMD (QC sample: RB-W-2) percent recoveries and RPDs, and QLS percent differences.

All samples were analyzed within the 40 day extract holding time.

No target analytes were detected in the LRB associated with these samples.

Due to insufficient volume of sample, one sample container was divided to extract the MS/MSD.

Any questions in reference to this data package may be addressed to Ziyad Rajabi at (510) 412-2390.



## GLOSSARY

### Initial Calibration

The initial calibration demonstrates that the instrument has a linear calibration curve described by percent relative standard deviation (%RSD). The average calibration factors (CFs) determined in the initial calibration are used to quantitate analytes and surrogates.

### Quality Control Standard (QCS)

The quality control standard is a mid-point calibration standard prepared from a source different than the calibration standards.

The QCS is used to check the accuracy of the initial calibration standards.

### Calibration Verification (CV)

The calibration verification checks the instrument performance daily by ensuring the instrument continues to meet the linear calibration curve as demonstrated by percent difference (%D).

### Quantitation Limit Standard (QLS)

The quantitation limit standard is used to demonstrate low level quantitation performance for all target compounds.

### Laboratory Reagent Blanks (LRBs)

A laboratory reagent blank is laboratory reagent water or baked sand with all reagents, surrogates, and internal standards added and carried through the same sample preparation and analytical procedures as the field samples. The LRB is used to determine the level of contamination introduced by the laboratory during extraction and analysis.

### Surrogates

Surrogates are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples. All samples are spiked with surrogate compounds prior to extraction. Surrogate percent recovery (%R) provides information about both the laboratory performance on individual samples and the possible effects of the sample matrix on the analytical results.

### Laboratory Fortified Sample Matrix and Duplicate (LFM and LFMD) Analysis

Laboratory fortified sample matrix and duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample

nonhomogeneity in soils, or matrix effects which may interfere with analysis.

#### Laboratory Fortified Blank (LFB) Analysis

A laboratory fortified blank is laboratory reagent water or baked sand with all reagents, surrogates, internal standards and representative target compounds added and carried through the same sample preparation and analytical procedures as the field samples. The LFB analyses provide information about the laboratory and method performance. Poor percent recovery (%R) results may indicate poor laboratory technique or poor method performance for a particular class of compounds.

#### Suffixes to Sample ID and Lab ID

The following suffixes may be attached to sample ID's and lab ID's to distinguish between different extraction samples or analytical runs: RE for reextraction, RA for reanalysis, and DL for dilution analysis.

### DATA PACKAGE COMMENTS

The software places "m" flags on quantitation reports and enhanced chromatograms for non-manually integrated data whenever the software sums several peaks.

Sample components in the Oil range contributed to Diesel range quantitation in samples MW1-GW-1, MW3-GW-1 and MW3-GW-2. Diesel quantitation were estimated to be between ½ the QL and the QL. Sample chromatograms did not display any discernable diesel hydrocarbon pattern; therefore, the samples diesel values were reported as non-detect.

#### Example calculations:

TPH-DRO concentration for sample TBS252 (LFB) using datafile 254Z008.D:

$$\text{Conc. } (\mu\text{g/L}) = \frac{A_x \times V_t \times \text{DF} \times 1,000 \text{ mL/L}}{\text{RF} \times V_o}$$

where:

$A_x$  = area sum response of the sample  
 $\text{DF}$  = dilution factor  
 $\text{RF}$  = mean response factor  
(area/concentration) from the initial calibration of 08/19/02 (Z081902A)  
 $V_o$  = volume of water extracted in mL  
 $V_t$  = volume of concentrated extract in mL

$$= \frac{1,432,287,091 \times 5\text{mL} \times 1 \times 1,000 \text{ mL/L}}{3,465,000 (\text{ng}^{-1}) \times 991.8 \text{ mL}}$$
$$= 2,083 \approx 2,100 \mu\text{g/L}$$

Surrogate % Recovery for sample AB39944 (FB-W-1) using datafile 254Z011.D:

$$\% \text{ Rec} = \frac{A_x \times 100}{\text{RF} \times S}$$

where:

$S$  = amount spiked (50 ug/mL)  
 $\text{RF}$  = mean response factor  
(area/concentration) from the initial calibration of 08/19/02 (Z081902A)

$$= \frac{154,274,693 \times 100}{3,322,000 \times 50}$$

=93 % recovery

**EPA REGION 9 LABORATORY - RICHMOND CA  
SUMMARY OF ANALYTICAL RESULTS**

Case: R02S80  
 Site: Belavstegui Park  
 SDG: 02242B  
 Date: 10/1/02  
 Analysis: 8015B  
 Matrix: water

Sample No. Lab Sample ID Date of Collection Units Analyte	FB-W-1 AB36644 9/3/02		MW1-GW-1 AB36640 9/3/02		MW2-GW-1 AB36641 9/3/02		MW3-GW-1 AB36642 9/3/02		MW3-GW-2 AB36643 9/3/02	
	ug/L Result	Q Cmt	ug/L Result	Q Cmt	ug/L Result	Q Cmt	ug/L Result	Q Cmt	ug/L Result	Q Cmt
TPH as Diesel	200	U	200	U	200	U	200	UJ	200	UJ
TPH as Motor Oil	1000	U	1000	U	1000	U	1000	UJ	1000	J

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

**EPA REGION 9 - LABORATORY - RICHMOND CA**  
**SUMMARY OF ANALYTICAL RESULTS**

Case: R02S80  
 Site: Belavstegui Park  
 SDG: 02242B  
 Date: 10/1/02  
 Analysis: 8015B  
 Matrix: water

Sample No.	RB-W-2		
Lab Sample ID	AB36606		
Date of Collection	8/27/02		
Units	ug/L		
Analyte	Result	Q	Cmt
TPH as Diesel	200	U	
TPH as Motor Oil	1000	U	

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP (SDG):** 02242B  
**PROGRAM:** Superfund  
**DOCUMENT CONTROL #:** B0101126-1999  
**ANALYSIS PERFORMED:** Total Petroleum Hydrocarbons-Gasoline  
Range Organics (TPH-GRO)  
**DATE :** October 4, 2002

**SAMPLE NUMBERS:**

<u>Client Sample No</u>	<u>Laboratory Sample ID</u>	<u>Client Sample No</u>	<u>Laboratory Sample ID</u>
RB-W-2	AB36606	MW3-GW-1	AB36642
MW1-GW-1	AB36640	MW3-GW-2	AB36643
MW2-GW-1	AB36641	FB-W-1	AB36644

**GENERAL COMMENTS**

Six (6) water samples were received at the EPA Region 9 Laboratory on 08/30/02 and 09/05/02 from the Belavstegui Park site for determination of TPH-GRO.

These samples were analyzed for TPH-GRO in accordance with the Region 9 Laboratory SOP 380, *Purgeable Aromatics and Hydrocarbons by GC PID/FID* based on EPA SW-846 Method 5030B, # 5035, 8015B, and 8021B *Nonhalogenated Organics Using GC/FID*, Revision 2, December 1996.

The laboratory chose a QC sample at random because none was designated by the field samplers on the chain-of-custody forms.

**SAMPLE RECEIPT AND PRESERVATION**

Vials containing sample RB-W-2 were labeled RBW-3 in the field. Sample RB-W-2 (AB36606) was not preserved in the field. No other shipping or preservation issues were encountered with these samples.

**QA/QC AND ANALYTICAL COMMENTS**

The following QC results are associated with the samples in this SDG:

QC limits were met for all initial calibration %RSDs, CV %Ds, LFB percent recovery, LFM/LFMD (QC sample:# RB-W-2 and MW1-GW-1) percent recoveries and RPD, and QLS percent differences.

All samples were extracted and analyzed within the 14 day holding time.

No target analytes were detected in the LRBs and storage blank associated with these samples.

There was no storage blank for the sample that arrived on 8/30/02 because it was analyzed on the same day.

Any questions in reference to this data package may be addressed to Ziyad Rajabi at (510) 412-2390.

## GLOSSARY

### Initial Calibration

The initial calibration demonstrates that the instrument has a linear calibration curve described by percent relative standard deviation (%RSD). The average calibration factors (CFs) determined in the initial calibration are used to quantitate analytes and surrogates.

### Quality Control Standard (QCS)

The quality control standard is a mid-point calibration standard prepared from a source different than the calibration standards. The QCS is used to check the accuracy of the initial calibration standards.

### Calibration Verification (CV)

The calibration verification checks the instrument performance daily by ensuring the instrument continues to meet the linear calibration curve as demonstrated by percent difference (%D).

### Quantitation Limit Standard (QLS)

The quantitation limit standard is used to demonstrate low level quantitation performance for all target compounds.

### Laboratory Reagent Blanks (LRBs)

A laboratory reagent blank is laboratory reagent water or baked sand with all reagents, surrogates, and internal standards added and carried through the same sample preparation and analytical procedures as the field samples. The LRB is used to determine the level of contamination introduced by the laboratory during extraction and analysis.

### Surrogates

Surrogates are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples. All samples are spiked with surrogate compounds prior to extraction. Surrogate percent recovery (%R) provides information about both the laboratory performance on individual samples and the possible effects of the sample matrix on the analytical results.

### Laboratory Fortified Sample Matrix and Duplicate (LFM and LFMD) Analysis

Laboratory fortified sample matrix and duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample nonhomogeneity in soils, or matrix effects which may interfere with analysis.

### Laboratory Fortified Blank (LFB) Analysis

A laboratory fortified blank is laboratory reagent water or baked sand with all reagents, surrogates, internal standards and representative target compounds added and carried through the same sample preparation and analytical procedures as the field samples. The LFB analyses provide information about the laboratory and method performance. Poor percent recovery (%R)

results may indicate poor laboratory technique or poor method performance for a particular class of compounds.

Suffixes to Sample ID and Lab ID

The following suffixes may be attached to sample ID's and lab ID's to distinguish between different extraction samples or analytical runs: RE for reextraction, RA for reanalysis, and DL for dilution analysis.

## DATA PACKAGE COMMENTS

The software places "m" flags on quantitation reports and enhanced chromatograms for non-manually integrated data whenever the software sums several peaks.

At EPA request, the laboratory initiated a minor deviation from SOP 380. The quant report has been modified to give result in concentration units rather than amount. This requires a modification in the equation to calculate result.

### Example calculations:

TPH-GRO concentration for sample AB36606MS (RB-W-2) using datafile 242L008.D:

$$\text{Conc. } (\mu\text{g/L}) = \frac{A_x \times \text{DF}}{\text{RF} \times}$$

where:

$A_x$  = area sum response of the sample  
 $\text{DF}$  = dilution factor  
 $\text{RF}$  = mean response factor from the initial calibration of 08/19/02

$$= \frac{13,156,863 \times 1}{45,520}$$

$$= 289.0 \approx 290 \mu\text{g/L}$$

Surrogate % Recovery for sample AB36642 (MW3-GW-1) using datafile 249L012.D:

$$\% \text{ Rec} = \frac{A_x \times 100}{\text{RF} \times S}$$

where:

$S$  = amount spiked (125 ug/L)  
 $\text{RF}$  = mean response factor from the initial calibration of 08/19/02

$$= \frac{4,809,852 \times 100}{41,100 \times 125}$$

$$= 94 \% \text{ recovery}$$

EPA REGION 9 - LABORATORY - RICHMOND, CA  
SUMMARY OF ANALYTICAL RESULTS

Case: R02S80  
 Site: Belavstegui Park  
 SDG: 02242B  
 Date: 9/12/02  
 Analysis: 8015B  
 Matrix: water

Sample No. Lab Sample ID Date of Collection Units Analyte	FB-W-1 AB36644 9/3/02 ug/L	MW1-GW-1 AB36640 9/3/02 ug/L	MW2-GW-1 AB36641 9/3/02 ug/L	MW3-GW-1 AB36642 9/3/02 ug/L	MW3-GW-2 AB36643 9/3/02 ug/L	Q		Cmt											
						Result	Limit	Q	U	Cmt	Q	U							
TPH as Gasoline	50																		

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

**EPA REGION 9 - LABORATORY - RICHMOND\_CA  
SUMMARY OF ANALYTICAL RESULTS**

Case: R02S80  
 Site: Belavstegui Park  
 SDG: 02242B  
 Date: 9/12/02  
 Analysis: 8015B  
 Matrix: water

Sample No.	RB-W-2
Lab Sample ID	AB36606
Date of Collection	8/27/02
Units	ug/L
Analyte	Result
TPH as Gasoline	50
	Q
	U
	Cmt

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP:** 02242B  
**PROGRAM:** Superfund  
**DOCUMENT CONTROL #:** B0101126-1998  
**ANALYSIS PERFORMED:** 524.2  
**DATE:** October 4, 2002  
**SAMPLE NUMBERS:**

<u>Sample ID</u>	<u>Laboratory Sample ID</u>	<u>Sample ID</u>	<u>Laboratory Sample ID</u>
RB-W-2	AB36606	MW3-GW-1	AB36642
MW1-GW-1	AB36640	MW3-GW-2	AB36643
MW2-GW-1	AB36641	FB-W-1	AB36644

**GENERAL COMMENTS**

Six (6) water samples were received at the EPA Region 9 Laboratory on 08/30/02 and 09/05/02 from the Belavstegui Park Superfund site.

These samples were analyzed for volatile organics in accordance with the USEPA Region 9 Laboratory SOP 354, Volatile Organic Analysis (Reference Method 524.2).

**SAMPLE RECEIPT AND PRESERVATION**

Vials containing sample RB-W-2 were labeled RBW-3 in the field. No other issues related to shipping and preservation were encountered with these samples.

**QA/QC AND ANALYTICAL COMMENTS**

The following comments appear on the Summary of Analytical Results:

- A The following LCS exceeded QC limits. Since the value is biased low, the reported values for the compound in samples and associated method blank should be considered as estimates and "J" flagged in the summary of results spreadsheet.

LCS File ID	Date	Analyte	% Rec	QC Limit
LWJ0905	09/05/02	Dichlorodifluoromethane	47	60 - 140

LWJ0906	09/06/02	Dichlorodifluoromethane	46	60 - 140
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No target analytes were detected in the method blanks associated with these samples.

No target analytes were detected in the storage blanks associated with these samples.

All surrogate recoveries were within QC limits.

The accuracy and precision of the MS/MSD (QC Samples:MW1-GW-1, AB36640) were within QC limits.

All internal standard areas and retention times were within QC limits.

All samples were analyzed within the holding time.

### **RESULTS SUMMARY**

The results can be found on the Summary of Results report.

Any questions in reference to this data package may be addressed to Ziyad Rajabi at (510) 412-2390.

## Glossary

### Method Blanks

A laboratory method blank is laboratory reagent water or sand with all reagents, surrogates, and internal standards added and carried through the same sample preparation and analytical procedures as the field samples. The laboratory method blank is used to determine the level of contamination introduced by the laboratory during analysis.

### Storage Blanks

A storage blank is laboratory reagent water that is stored in the laboratory refrigerator for one week. All reagents, surrogates, and internal standards are added at the time of analysis and it is processed through the same sample preparation and analytical procedures as the other blanks. The storage blank is used to determine the level of contamination introduced by the laboratory during sample storage.

### Surrogates

Surrogates are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples. All samples are spiked with surrogate compounds prior to analysis. Surrogate percent recovery (%R) provides information about both the laboratory performance on individual samples and the possible effects of the sample matrix on the analytical results.

### Matrix Spike and Spike Duplicate Analysis

Matrix spike sample and spike duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample nonhomogeneity in soils, or matrix effects which may interfere with analysis.

### Internal Standards

Internal standards are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but not normally found in environmental samples. All samples are spiked with internal standard compounds prior to analysis. Internal standard recoveries and retention times provide information about both the instrument performance on individual samples and the possible effects of the sample matrix on the analytical results.

### Laboratory Control Samples

Laboratory control samples (LCSs) are analyzed daily to demonstrate comparability of the continuing calibration standard. It is equivalent to the continuing calibration standard, but it is obtained from an independent source.

## ANALYTICAL COMMENTS

Example calculation using data for benzene obtained for sample (MW1-GW-1MS7, AB36640MS), date file (02J1862.D) analyzed on 09/06/02:

$$\begin{aligned}\text{Conc. } (\mu\text{g/L}) &= A_x * \text{AMT}_{\text{IS}} * \text{DF} / (A_{\text{IS}} * \text{RRF}) \\ &= 560977 * 5 \mu\text{g/L} * 1 / (549447 * 1.171) \\ &= 4.36 \mu\text{g/L}\end{aligned}$$

where

$A_x$  = area of the characteristic ion of the compound

$\text{AMT}_{\text{IS}}$  = concentration of internal standard in  $\mu\text{g/L}$  (5  $\mu\text{g/L}$  for 25-mL analyses)

DF = dilution factor

$A_{\text{IS}}$  = area of the characteristic ion of the associated internal standard

RRF = analyte's relative response factor from the initial calibration

### Instrument Calibration:

*The initial calibration demonstrates that the instrument is capable of meeting the minimum relative response factors (RRFs) and has a linear calibration curve.*

All analytes in the initial calibrations were within QC limits.

*The continuing calibration checks the instrument performance daily.*

*All analytes in the continuing calibration were within QC limits.*

*The quantitation limit standard is used to demonstrate low level quantitation performance for the following five analytes: (1) vinyl chloride, (2) carbon tetrachloride, (3) 1,2-dichloroethane, (4) cis-1,3-dichloropropene, and (5) trans-1,3-dichloropropene, in accordance with SOP requirements. This requirement is necessary to support the 0.5  $\mu\text{g/L}$  quantitation limit for these analytes.*

All low-level verification compounds and other analytes met QC specifications (50 - 150%) except the following:

Filename	Instrument	Date	Analyte	% Recovery
QWJ0905	HP5973J	09/05/02	Acetone	187
QWJ0906	HP5973J	09/06/02	Acetone	160

There were no detected results for these analytes associated with these QLS. Quantitation limits are not "J" flagged because the bias is positive.

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EPA REGION 9 LABORATORY - RICHMOND, CA  
SUMMARY OF ANALYTICAL RESULTS

Case: R02S80  
Site: Belavstegui Park  
SDG: 02242B  
Date: 10/3/02  
Analysis: 524.2  
Matrix: water

Sample No. Lab Sample ID Date of Collection Units Analyte	FB-W-1 AB36644 9/3/02		MW1-GW-1 AB36640 9/3/02		MW2-GW-1 AB36641 9/3/02		MW3-GW-1 AB36642 9/3/02		MW3-GW-2 AB36643 9/3/02	
	ug/L Result	Q Cmt	ug/L Result	Q Cmt	ug/L Result	Q Cmt	ug/L Result	Q Cmt	ug/L Result	Q Cmt
Dichlorodifluoromethane	1	UJ A	1	UJ A	1	UJ A	1	UJ A	1	UJ A
Chloromethane	1	U	1	U	1	U	1	U	1	U
Vinyl chloride	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromomethane	1	U	1	U	1	U	1	U	1	U
Chloroethane	1	U	1	U	1	U	1	U	1	U
Trichlorofluoromethane	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethene	1	U	1	U	1	U	1	U	1	U
1,1,2-Trichlorotrifluoroethane	1	U	1	U	1	U	1	U	1	U
Acetone	4	U	4	U	4	U	4	U	4	U
Methylene Chloride	1	U	1	U	1	U	1	U	1	U
trans-1,2-Dichloroethene	1	U	1	U	1	U	1	U	1	U
Methyl t-butyl ether (MTBE)	1	U	1	U	1	U	1	U	1	U
1,1-Dichloroethane	1	U	1	U	1	U	1	U	1	U
2,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U
cis-1,2-Dichloroethene	1	U	1	U	1	U	1	U	1	U
Bromochloromethane	1	U	1	U	1	U	1	U	1	U
Chloroform	1	U	1	U	1	U	1	U	1	U
1,1,1-Trichloroethane	1	U	1	U	1	U	1	U	1	U
1,1-Dichloropropene	1	U	1	U	1	U	1	U	1	U
2-Butanone	4	U	4	U	4	U	4	U	4	U
Benzene	1	U	1	U	1	U	1	U	1	U
1,2-Dichloroethane	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Carbon tetrachloride	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	1	U	1	U	1	U	1	U	1	U
1,2-Dichloropropane	1	U	1	U	1	U	1	U	1	U
Dibromomethane	1	U	1	U	1	U	1	U	1	U
Bromodichloromethane	1	U	1	U	1	U	1	U	1	U
cis-1,3-Dichloropropene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
trans-1,3-Dichloropropene	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	1	U	1	U	1	U	1	U	1	U
Toluene	1	U	1	U	1	U	1	U	1	U
Tetrachloroethene	1	U	1	U	1	U	1	U	1	U
1,3-Dichloropropane	1	U	1	U	1	U	1	U	1	U
Dibromochloromethane	1	U	1	U	1	U	1	U	1	U

Cmt: Refer to corresponding section in the report narrative for each letter

N/A: Not Applicable

N/R: Not Reported

U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any

J: Estimated

**EPA REGION 9 - LABORATORY - RICHMOND, CA  
SUMMARY OF ANALYTICAL RESULTS**

Case: R02S80  
 Site: Belavstegui Park  
 SDG: 02242B  
 Date: 10/3/02  
 Analysis: 524.2  
 Matrix: water

Sample No. Lab Sample ID Date of Collection Units Analyte	FB-W-1 AB36644 9/3/02		MW1-GW-1 AB36640 9/3/02		MW2-GW-1 AB36641 9/3/02		MW3-GW-1 AB36642 9/3/02		MW3-GW-2 AB36643 9/3/02			
	ug/L Result	Q	Cmt	ug/L Result	Q	Cmt	ug/L Result	Q	Cmt	ug/L Result	Q	Cmt
1,2-Dibromoethane (EDB)	1	U		1	U		1	U		1	U	
Chlorobenzene	1	U		1	U		1	U		1	U	
1,1,1,2-Tetrachloroethane	1	U		1	U		1	U		1	U	
Ethylbenzene	1	U		1	U		1	U		1	U	
m,p-Xylene	1	U		1	U		1	U		1	U	
o-Xylene	1	U		1	U		1	U		1	U	
Styrene	1	U		1	U		1	U		1	U	
Bromoform	1	U		1	U		1	U		1	U	
Isopropylbenzene	1	U		1	U		1	U		1	U	
Bromobenzene	1	U		1	U		1	U		1	U	
1,1,1,2-Tetrachloroethane	1	U		1	U		1	U		1	U	
1,2,3-Trichloropropane	1	U		1	U		1	U		1	U	
n-Propylbenzene	1	U		1	U		1	U		1	U	
2-Chlorotoluene	1	U		1	U		1	U		1	U	
4-Chlorotoluene	1	U		1	U		1	U		1	U	
1,3,5-Trimethylbenzene	1	U		1	U		1	U		1	U	
tert-Butylbenzene	1	U		1	U		1	U		1	U	
1,2,4-Trimethylbenzene	1	U		1	U		1	U		1	U	
sec-Butylbenzene	1	U		1	U		1	U		1	U	
1,3-Dichlorobenzene	1	U		1	U		1	U		1	U	
1,4-Dichlorobenzene	1	U		1	U		1	U		1	U	
p-Isopropyltoluene	1	U		1	U		1	U		1	U	
1,2-Dichlorobenzene	1	U		1	U		1	U		1	U	
n-Butylbenzene	1	U		1	U		1	U		1	U	
1,2-Dibromo-3-chloropropane	2	U		2	U		2	U		2	U	
1,2,4-Trichlorobenzene	1	U		1	U		1	U		1	U	
Hexachlorobutadiene	1	U		1	U		1	U		1	U	
Naphthalene	1	U		1	U		1	U		1	U	
1,2,3-Trichlorobenzene	1	U		1	U		1	U		1	U	

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

EPA REGION 9 LABORATORY - RICHMOND, CA  
SUMMARY OF ANALYTICAL RESULTS

Case: R02S80  
Site: Belavstegui Park  
SDC: 02242B  
Date: 10/3/02  
Analysis: 524.2  
Matrix: water

Sample No. Lab Sample ID Date of Collection Units Analyte	RB-W-2 AB36606 8/27/02			METHOD BLANK 1 242BMWJ0905 9/5/02			METHOD BLANK 2 242BMWJ0906 9/6/02		
	ug/L Result	Q	Cmt	ug/L Result	Q	Cmt	ug/L Result	Q	Cmt
Dichlorodifluoromethane	1	U	A	1	U	A	1	U	A
Chloromethane	1	U		1	U		1	U	
Vinyl chloride	0.5	U		0.5	U		0.5	U	
Bromomethane	1	U		1	U		1	U	
Chloroethane	1	U		1	U		1	U	
Trichlorofluoromethane	1	U		1	U		1	U	
1,1-Dichloroethene	1	U		1	U		1	U	
1,1,2-Trichlorotrifluoroethane	1	U		1	U		1	U	
Acetone	4	U		4	U		4	U	
Methylene Chloride	1	U		1	U		1	U	
trans-1,2-Dichloroethene	1	U		1	U		1	U	
Methyl t-butyl ether (MTBE)	1	U		1	U		1	U	
1,1-Dichloroethane	1	U		1	U		1	U	
2,2-Dichloropropane	1	U		1	U		1	U	
cis-1,2-Dichloroethene	1	U		1	U		1	U	
Bromochloromethane	1	U		1	U		1	U	
Chloroform	1	U		1	U		1	U	
1,1,1-Trichloroethane	1	U		1	U		1	U	
1,1-Dichloropropene	1	U		1	U		1	U	
2-Butanone	4	U		4	U		4	U	
Benzene	1	U		1	U		1	U	
1,2-Dichloroethane	0.5	U		0.5	U		0.5	U	
Carbon tetrachloride	0.5	U		0.5	U		0.5	U	
Trichloroethene	1	U		1	U		1	U	
1,2-Dichloropropane	1	U		1	U		1	U	
Dibromomethane	1	U		1	U		1	U	
Bromodichloromethane	1	U		1	U		1	U	
cis-1,3-Dichloropropene	0.5	U		0.5	U		0.5	U	
trans-1,3-Dichloropropene	0.5	U		0.5	U		0.5	U	
1,1,2-Trichloroethane	1	U		1	U		1	U	
Toluene	1	U		1	U		1	U	
Tetrachloroethene	1	U		1	U		1	U	
1,3-Dichloropropane	1	U		1	U		1	U	
Dibromochloromethane	1	U		1	U		1	U	

Cmt: Refer to corresponding section in the report narrative for each letter  
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U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
J: Estimated

FPA REGION 9 LABORATORY - RICHMOND, CA  
SUMMARY OF ANALYTICAL RESULTS

Case: R02S80  
Site: Belavstegni Park  
SDG: 02242B  
Date: 10/3/02  
Analysis: S24.2  
Matrix: water

Sample No. Lab Sample ID Date of Collection Units Analyte	RB-W-2 AB36606 8/27/02			METHOD BLANK 1 242BMWJ0905 9/5/02			METHOD BLANK 2 242BMWJ0906 9/6/02		
	ug/L Result	Q	Cmt	ug/L Result	Q	Cmt	ug/L Result	Q	Cmt
1,2-Dibromochane (EDB)	1	U		1	U		1	U	
Chlorobenzene	1	U		1	U		1	U	
1,1,1,2-Tetrachloroethane	1	U		1	U		1	U	
Ethylbenzene	1	U		1	U		1	U	
m,p-Xylene	1	U		1	U		1	U	
o-Xylene	1	U		1	U		1	U	
Styrene	1	U		1	U		1	U	
Bromoform	1	U		1	U		1	U	
Isopropylbenzene	1	U		1	U		1	U	
Bromobenzene	1	U		1	U		1	U	
1,1,2,2-Tetrachloroethane	1	U		1	U		1	U	
1,2,3-Trichloropropane	1	U		1	U		1	U	
n-Propylbenzene	1	U		1	U		1	U	
2-Chlorotoluene	1	U		1	U		1	U	
4-Chlorotoluene	1	U		1	U		1	U	
1,3,5-Trimethylbenzene	1	U		1	U		1	U	
tert-Butylbenzene	1	U		1	U		1	U	
1,2,4-Trimethylbenzene	1	U		1	U		1	U	
sec-Butylbenzene	1	U		1	U		1	U	
1,3-Dichlorobenzene	1	U		1	U		1	U	
1,4-Dichlorobenzene	1	U		1	U		1	U	
p-Isopropyltoluene	1	U		1	U		1	U	
1,2-Dichlorobenzene	1	U		1	U		1	U	
n-Butylbenzene	1	U		1	U		1	U	
1,2-Dibromo-3-chloropropane	2	U		2	U		2	U	
1,2,4-Trichlorobenzene	1	U		1	U		1	U	
Hexachlorobutadiene	1	U		1	U		1	U	
Naphthalene	1	U		1	U		1	U	
1,2,3-Trichlorobenzene	1	U		1	U		1	U	

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 J: Estimated



**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP (SDG):** 02240A  
**PROGRAM:** Superfund  
**DOCUMENT CONTROL #:** B0101126-1966  
**ANALYSIS PERFORMED:** Total Petroleum Hydrocarbons-Diesel  
Range Organics (TPH-DRO)  
**DATE :** September 27, 2002

**SAMPLE NUMBERS:**

<u>Client</u> <u>Sample No.</u>	<u>Laboratory</u> <u>Sample ID</u>	<u>Client</u> <u>Sample No.</u>	<u>Laboratory</u> <u>Sample ID</u>
MW2-S-5-1	AB36547	MW3-S-5-1	AB36549
MW1-S-5-1	AB36548	MW3-S-5-2	AB36550

**GENERAL COMMENTS**

Four (4) soil samples were received at the EPA Region 9 Laboratory on 08/30/02 from the Belavstegui Park site for determination of TPH-DRO.

These samples were analyzed for TPH-DRO in accordance with the Region 9 Laboratory SOP 385, *Extractable Petroleum Hydrocarbons by GC FID* based on EPA SW-846 Method 8015B, *Nonhalogenated Organics Using GC/FID*, Revision 2, December 1996 and Region 9 Laboratory SOP 280, *Extraction of Petroleum Hydrocarbons in Soil Samples Using Pressurized Fluid Extraction* based on EPA SW-846 Method 3545, *Pressurized Fluid Extraction*, Revision 0, December 1996.

Results are reported on a dry-weight basis.

The laboratory chose a QC sample at random because none was designated by the field samplers on the chain-of-custody forms.

**SAMPLE RECEIPT AND PRESERVATION**

No shipping or preservation issues were encountered with these samples.

## **QA/QC AND ANALYTICAL COMMENTS**

The following QC results are associated with the samples in this SDG:

QC limits were met for all initial calibration, CVs, QCS percent differences, surrogate percent recoveries, LFB percent recoveries, and QLS percent differences.

All samples were extracted within the 14 day holding time for soil samples and analyzed within the 40 day extract holding time.

No target analytes were detected in the LRBs associated with these samples.

Any questions in reference to this data package may be addressed to Ziyad Rajabi at (510) 412-2390.

## GLOSSARY

### Initial Calibration

The initial calibration demonstrates that the instrument has a linear calibration curve described by percent relative standard deviation (%RSD). The average calibration factors (CFs) determined in the initial calibration are used to quantitate analytes and surrogates.

### Quality Control Standard (QCS)

The quality control standard is a mid-point calibration standard prepared from a source different than the calibration standards. The QCS is used to check the accuracy of the initial calibration standards.

### Calibration Verification (CV)

The calibration verification checks the instrument performance daily by ensuring the instrument continues to meet the linear calibration curve as demonstrated by percent difference (%D).

### Quantitation Limit Standard (QLS)

The quantitation limit standard is used to demonstrate low level quantitation performance for all target compounds.

### Laboratory Reagent Blanks (LRBs)

A laboratory reagent blank is laboratory reagent water or baked sand with all reagents, surrogates, and internal standards added and carried through the same sample preparation and analytical procedures as the field samples. The LRB is used to determine the level of contamination introduced by the laboratory during extraction and analysis.

### Surrogates

Surrogates are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples. All samples are spiked with surrogate compounds prior to extraction. Surrogate percent recovery (%R) provides information about both the laboratory performance on individual samples and the possible effects of the sample matrix on the analytical results.

### Laboratory Fortified Sample Matrix and Duplicate (LFM and LFMD) Analysis

Laboratory fortified sample matrix and duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample nonhomogeneity in soils, or matrix effects which may interfere with analysis.

### Laboratory Fortified Blank (LFB) Analysis

A laboratory fortified blank is laboratory reagent water or baked sand with all reagents, surrogates, internal standards and representative target compounds added and carried through the same sample preparation and analytical procedures as the field samples. The LFB analyses provide information about the laboratory and method performance. Poor percent recovery (%R)

results may indicate poor laboratory technique or poor method performance for a particular class of compounds.

Suffixes to Sample ID and Lab ID

The following suffixes may be attached to sample ID's and lab ID's to distinguish between different extraction samples or analytical runs: RE for reextraction, RA for reanalysis, and DL for dilution analysis.

## DATA PACKAGE COMMENTS

The software places "m" flags on quantitation reports and enhanced chromatograms for non-manually integrated data whenever the software sums several peaks, but does not place "m" flags on quantitation reports and enhanced chromatograms for manually integrated data from summed peaks.

Sample components in the Oil range contributed to Diesel range quantitation. SOP 385 quantitation criteria was applied; therefore, the quantitation limit for diesel was raised reported accordingly.

The quant report has been modified to give result in concentration units rather than amount. This requires a modification in the equation to calculate result.

### Example calculations:

Oil concentration for sample AB36550 (MW3-S-5-2) using data file 254Z017.D:

$$\text{Conc. (mg/Kg)} = \frac{A_x \times V_t \times DF}{RF \times W \times D}$$

where:

$A_x$	= area sum response of the sample
$D$	= dry weight factor (Percent solids/100)
$W$	= weight of sample in grams
$RF$	= mean response factor from the initial calibration of 08/19/02
$V_t$	= volume of concentrated extract in mL
$DF$	= dilution factor

$$= \frac{14,058,320,836 \times 3 \text{ mL} \times 1}{3,332,000 (\mu\text{g/mL})^{-1} \times 6.59 \text{ g} \times 0.95}$$

$$= 2021 \approx 2000 \text{ mg/Kg}$$

Surrogate % Recovery for sample AB36548 (MW1-S-5-1) using data file 248F029.D:

$$\% \text{ Rec} = \frac{A_x \times DF \times 100}{RF \times S}$$

where:

$S$	= amount spiked (50 $\mu\text{g/mL}$ )
$RF$	= mean response factor from the initial calibration of 8/19/02

$$= \frac{139,713,273 \times 1 \times 100}{3,322,000 (\mu\text{g/mL})^{-1} \times 50 \mu\text{g/mL}} = 84 \% \text{ recovery}$$

EPA REGION 9 LABORATORY - RICHMOND, CA  
SUMMARY OF ANALYTICAL RESULTS

Case: R02S80  
 Site: Belavstegui Park  
 SDG: 02240A  
 Date: 9/27/02  
 Analysis: 8015B  
 Matrix: SOIL

Sample No. Lab Sample ID Date of Collection Location Units Analyte	MW1-S-5-1 AB36548 8/27/02 89		MW2-S-5-1 AB36547 8/27/02 92		MW3-S-5-1 AB36549 8/27/02 91		MW3-S-5-2 AB36550 8/27/02 95	
	mg/Kg Result	Q Cmt	mg/Kg Result	Q Cmt	mg/Kg Result	Q Cmt	mg/Kg Result	Q Cmt
TPH as Diesel	6	U	5	U	50	U	150	U
TPH as Motor Oil	20	U	20	U	740	U	2000	U

Results are reported on a dry weight basis

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP (SDG):** 02240A  
**PROGRAM:** Superfund  
**DOCUMENT CONTROL #:** B0101126-1895  
**ANALYSIS PERFORMED:** Total Petroleum Hydrocarbons-Gasoline  
Range Organics (TPH-GRO)  
**DATE :** September 11, 2002

**SAMPLE NUMBERS:**

<u>Client Sample No</u>	<u>Laboratory Sample ID</u>	<u>Client SampleNo</u>	<u>Laboratory Sample ID</u>
MW2-S-5-1	AB36547	MW3-S-5-1	AB36549
MW1-S-5-1	AB36548	MW3-S-5-2	AB36550

**GENERAL COMMENTS**

Four (4) soil samples were received at the EPA Region 9 Laboratory on 08/28/02 from the Belavstegui Park site for determination of TPH-GRO.

These samples were analyzed for TPH-GRO in accordance with the Region 9 Laboratory SOP 380, *Purgeable Aromatics and Hydrocarbons by GC PID/FID* based on EPA SW-846 Method 5030B, 5035, 8015B, and 8021B *Nonhalogenated Organics Using GC/FID*, Revision 2, December 1996.

Soil sample results are reported on a dry-weight basis.

**SAMPLE RECEIPT AND PRESERVATION**

No shipping or preservation issues were encountered with these samples.

**QA/QC AND ANALYTICAL COMMENTS**

The following QC results are associated with the samples in this SDG:

QC limits were met for all initial calibration %RSDs, CV %Ds, LFB percent recovery and QLS percent differences.

No target analytes were detected in the LRB associated with these samples.

MS/MSD QC samples were not processed because insufficient sample was received.

Any questions in reference to this data package may be addressed to Ziyad Rajabi at (510) 412-2390.

## GLOSSARY

### Initial Calibration

The initial calibration demonstrates that the instrument has a linear calibration curve described by percent relative standard deviation (%RSD). The average calibration factors (CFs) determined in the initial calibration are used to quantitate analytes and surrogates.

### Quality Control Standard (QCS)

The quality control standard is a mid-point calibration standard prepared from a source different than the calibration standards. The QCS is used to check the accuracy of the initial calibration standards.

### Calibration Verification (CV)

The calibration verification checks the instrument performance daily by ensuring the instrument continues to meet the linear calibration curve as demonstrated by percent difference (%D).

### Quantitation Limit Standard (QLS)

The quantitation limit standard is used to demonstrate low level quantitation performance for all target compounds.

### Laboratory Reagent Blanks (LRBs)

A laboratory reagent blank is laboratory reagent water or baked sand with all reagents, surrogates, and internal standards added and carried through the same sample preparation and analytical procedures as the field samples. The LRB is used to determine the level of contamination introduced by the laboratory during extraction and analysis.

### Surrogates

Surrogates are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples. All samples are spiked with surrogate compounds prior to extraction. Surrogate percent recovery (%R) provides information about both the laboratory performance on individual samples and the possible effects of the sample matrix on the analytical results.

### Laboratory Fortified Sample Matrix and Duplicate (LFM and LFMD) Analysis

Laboratory fortified sample matrix and duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample nonhomogeneity in soils, or matrix effects which may interfere with analysis.

### Laboratory Fortified Blank (LFB) Analysis

A laboratory fortified blank is laboratory reagent water or baked sand with all reagents, surrogates, internal standards and representative target compounds added and carried through the same sample preparation and analytical procedures as the field samples. The LFB analyses provide information about the laboratory and method performance. Poor percent recovery (%R)

results may indicate poor laboratory technique or poor method performance for a particular class of compounds.

Suffixes to Sample ID and Lab ID

The following suffixes may be attached to sample ID's and lab ID's to distinguish between different extraction samples or analytical runs: RE for reextraction, RA for reanalysis, and DL for dilution analysis.

## DATA PACKAGE COMMENTS

The software places "m" flags on quantitation reports and enhanced chromatograms for non-manually integrated data whenever the software sums several peaks.

At EPA request, the laboratory initiated a minor deviation from SOP 380. The quant report has been modified to give result in concentration units rather than amount. This requires a modification in the equation to calculate result.

### Example calculations:

TPH-GRO concentration for sample GBS241 (LFB) using data file 241L006.D:

$$\text{Conc. (mg/Kg, dry weight)} = \frac{A_x \times V_t \times DF \times V_p \times 1,000 \mu\text{L/mL}}{RF \times W \times D \times V_i \times 1,000 \text{ ng/} \mu\text{g}}$$

where:

$A_x$	= area sum response of the sample
$D$	= dry weight factor (percent solids/100)
$W$	= weight of sample in grams
$RF$	= mean response factor (area/concentration) from the initial calibration of 08/19/02
$V_t$	= total volume of methanol extract in mL
$DF$	= dilution factor
$V_i$	= volume of extract injected in $\mu\text{L}$
$V_p$	= volume of extract purged in mL (5 mL)

$$\begin{aligned} &= \frac{11,693,124 \times 10\text{mL} \times 5\text{mL} \times 1 \times 1,000 \mu\text{L/mL}}{45,520(\text{ng/mL}) \times 5.0 \text{ g} \times 1 \times 100 \mu\text{L} \times 1,000 \text{ ng/} \mu\text{g}} \\ &= 25.69 \approx 26 \text{ mg/Kg} \end{aligned}$$

Surrogate % Recovery for sample AB35020 (WCC-59-2 ) using data file 112L019.D:

$$\% \text{ Rec} = \frac{A_x \times DF \times 100}{RF \times S}$$

where:

$S$	= amount spiked (125 ug/L)
$RF$	= mean response factor (area/concentration.) from the initial calibration of 04/05/01

$$\begin{aligned} &= \frac{4,714,363 \times 100}{41,100 \times 125} \\ &= 92 \% \text{ recovery} \end{aligned}$$

EPA REGION 9 LABORATORY - RICHMOND, CA  
 SUMMARY OF ANALYTICAL RESULTS

Case: R02S80  
 Site: Belavstegui Park  
 SDG: 02240A  
 Date: 9/6/02  
 Analysis: 8015B  
 Matrix: SOIL

Sample No.	MW1-S-5-1	MW2-S-5-1	MW3-S-5-1	MW3-S-5-2
Location	0	0	0	0
Depth (feet)	0	0	0	0
Lab Sample ID	AB36548	AB36547	AB36549	AB36550
Date of Collection	8/27/02	8/27/02	8/27/02	8/27/02
Units	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Analyte	Result	Result	Result	Result
TPH as Gasoline	5	5	5	5
	Q	Q	Q	Q
	U	U	U	U
	Cmt	Cmt	Cmt	Cmt

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP:** 02240A  
**PROGRAM:** Superfund  
**DOCUMENT CONTROL #:** B0101126-1959  
**ANALYSIS PERFORMED:** 8260B  
**DATE:** September 25, 2002

**SAMPLE NUMBERS:**

<u>Sample ID</u>	<u>Laboratory Sample ID</u>	<u>Sample ID</u>	<u>Laboratory Sample ID</u>
MW2-S-5-1	AB36547	MW3-S-5-1	AB36549
MW1-S-5-1	AB36548	MW3-S-5-2	AB36550

**GENERAL COMMENTS**

Four (4) soil samples were received at the EPA Region 9 Laboratory on 08/28/02 from the Belavstegui Park Brownfields Superfund site.

These samples were analyzed for volatile organics in accordance with the USEPA Region 9 Laboratory SOP 305, Volatile Organics Analysis in soil.

**SAMPLE RECEIPT AND PRESERVATION**

No issues related to shipping and preservation were encountered with these samples.

**QA/QC AND ANALYTICAL COMMENTS**

The following comments appear on the Summary of Analytical Results:

- A The following initial calibration analytes exceeded QC limits. The reported values for the compound in samples and associated method blanks should be considered as estimates and "J" flagged in the summary of results spreadsheet.

Instrument	Date	Analyte	Filename	Criteria	QC Limit	Result
HP5973H	08/29/02	Bromomethane	ISH0829	%RSD	20.5 %	23.2 %
HP5973H	08/29/02	Acetone	ISH0829	%RSD	20.5 %	37.9 %

- B The following LCS exceeded QC limits. Since the recovery is biased low, the reported values for the compound in samples should be considered as estimates and "J" flagged in the summary of results spreadsheet.

LCS File ID	Date	Analyte	% Rec	QC Limit
LSH0829A	08/29/02	Dichlorodifluoromethane	50	60 - 140

- C All surrogate recoveries were within QC limits except the following:

Sample ID	Laboratory Sample ID	Surrogate	Percent Recovery	QC Limit Percent Recovery
MW1-S-5-1	AB36548	Bromofluorobenzene	85	86 - 115

The sample was re-analyzed. Similar results were obtained for the re-analysis. Since the compound listed above is associated with internal standard, chlorobenzene-d5, the quantitation limits of all analytes associated with this internal standard should be estimated and "J" flagged in the summary of result spreadsheet.

- D All soil samples were not analyzed or preserved within forty eight (48) hour holding time. The reported values for all analytes are estimated and "J" flagged in the summary of results spreadsheet.

Sample ID	Laboratory Sample ID	Date/time Collected	Date/time Analyzed	Holding Time (Hrs)	Elapsed Hours	Hours Beyond
MW2-S-5-1	AB36547	08/27/02 7:30am	08/29/02 8:57pm	48	61	13
MW1-S-5-1	AB36548	08/27/02 8:34am	08/29/02 8:28pm	48	60	12
MW3-S-5-1	AB36549	08/27/02 9:35am	08/29/02 10:10am	48	49	1
MW3-S-5-2	AB36550	08/27/02 9:40am	08/29/02 9:56pm	48	60	12

- E The following continuing calibration analytes exceeded QC limits. The reported values for the compound in samples and associated method blanks should be considered as estimates and "J" flagged in the summary of results spreadsheet.

Instrument	Date	Analyte	Filename	Criteria	QC Limit	Result
HP5973H	08/30/02	Dichlorodifluoromethane	CWH082 7	%D	30 %	-33 %

No target analytes were detected in the method blanks associated with these samples.

The accuracy and precision of the MS/MSD (QC Samples: MW2-S-5-1, AB36547) were within QC limits. Since there are not sufficient sample for MSD run. The sample (MW3-S-5-2, AB36550) was chosen based on similar matrix and analyzed for MSD result.

All internal standard areas and retention times were within QC limits.

### **RESULTS SUMMARY**

The results can be found on the Summary of Results report.

Any questions in reference to this data package may be addressed to Ziyad Rajabi at (510) 412-2390.

## Glossary

### Method Blanks

A laboratory method blank is laboratory reagent water or sand with all reagents, surrogates, and internal standards added and carried through the same sample preparation and analytical procedures as the field samples. The laboratory method blank is used to determine the level of contamination introduced by the laboratory during analysis.

### Storage Blanks

A storage blank is laboratory reagent water that is stored in the laboratory refrigerator for one week. All reagents, surrogates, and internal standards are added at the time of analysis and it is processed through the same sample preparation and analytical procedures as the other blanks. The storage blank is used to determine the level of contamination introduced by the laboratory during sample storage.

### Surrogates

Surrogates are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but which are not normally found in environmental samples. All samples are spiked with surrogate compounds prior to analysis. Surrogate percent recovery (%R) provides information about both the laboratory performance on individual samples and the possible effects of the sample matrix on the analytical results.

### Matrix Spike and Spike Duplicate Analysis

Matrix spike sample and spike duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample nonhomogeneity in soils, or matrix effects which may interfere with analysis.

### Internal Standards

Internal standards are organic compounds which are similar to the target analytes in chemical composition and behavior in the analytical process, but not normally found in environmental samples. All samples are spiked with internal standard compounds prior to analysis. Internal standard recoveries and retention times provide information about both the instrument performance on individual samples and the possible effects of the sample matrix on the analytical results.

### Laboratory Control Samples

Laboratory control samples (LCSs) are analyzed daily to demonstrate comparability of the continuing calibration standard. It is equivalent to the continuing calibration standard, but it is obtained from an independent source.

## ANALYTICAL COMMENTS

Example calculation using data for benzene obtained for sample (MW2-S-5-1MS, AB36547MS), date file (02H1546.D) analyzed on 08/30/02:

$$\begin{aligned}\text{Conc. } (\mu\text{g/Kg}) &= A_x * \text{AMT}_{\text{IS}} / (A_{\text{IS}} * \text{RRF} * W * D) \\ &= 701867 * 250 \text{ ng} / (385655 * 1.852 * 4.85 * 0.92) \\ &= 55.06 \mu\text{g/kg} \approx 60 \mu\text{g/kg}\end{aligned}$$

where:

$A_x$  = area of the characteristic ion of the compound

$\text{AMT}_{\text{IS}}$  = amount of internal standard in ng (250 ng)

D = dry weight factor  $((100 - \% \text{Moisture})/100)$

W = weight of sample in grams

$A_{\text{IS}}$  = area of the characteristic ion of the associated internal standard

RRF = analyte's relative response factor from

### Instrument Calibration:

*The initial calibration demonstrates that the instrument is capable of meeting the minimum relative response factors (RRFs) and has a linear calibration curve.*

All analytes in the initial calibrations were within QC limits except as that stated in comment A.

*The continuing calibration checks the instrument performance daily and produces the relative response factors (RRFs) for target analytes that are used for quantitation.*

All analytes in the continuing calibration were within QC limits except as that stated in comment E.

*The quantitation limit standard is used to demonstrate low level quantitation performance for the following five analytes: (1) vinyl chloride, (2) carbon tetrachloride, (3) 1,2-dichloroethane, (4) cis-1,3-dichloropropene, and (5) trans-1,3-dichloropropene, in accordance with SOP requirements. This requirement is necessary to support the 0.5  $\mu\text{g/L}$  quantitation limit for these analytes.*

All low-level verification compounds and other analytes met QC specifications (50 - 150%) except as noted in comment B.

EPA REGION 9 LABORATORY - RICHMOND, CA  
SUMMARY OF ANALYTICAL RESULTS

Case: R02S80  
Site: Belavstegui Park  
SDG: 02240A  
Date: 9/26/02  
Analysis: 8260B  
Matrix: SOIL

Sample No. Lab Sample ID Date of Collection Units Analyte	MW1-S-5-1 AB36548 8/27/02			MW2-S-5-1 AB36547 8/27/02			MW3-S-5-1 AB36549 8/27/02			MW3-S-5-2 AB36550 8/27/02		
	ug/Kg Result	Q	Cmt									
Dichlorodifluoromethane	10	UJ	BD	10	UJ	BD	10	UJ	DE	10	UJ	BD
Chloromethane	10	UJ	D									
Vinyl chloride	10	UJ	D									
Bromomethane	10	UJ	AD									
Chloroethane	10	UJ	D									
Trichlorofluoromethane	10	UJ	D									
1,1-Dichloroethene	10	UJ	D									
Acetone	10	UJ	AD									
Carbon disulfide	10	UJ	D									
Dichloromethane	10	UJ	D									
Methyl t-butyl ether (MTBE)	10	UJ	D									
trans-1,2-Dichloroethene	10	UJ	D									
1,1-Dichloroethane	10	UJ	D									
Ethyl-t-butyl ether	10	UJ	D									
cis-1,2-Dichloroethene	10	UJ	D									
2-Butanone	10	UJ	D									
Chloroform	10	UJ	D									
1,2-Dichloroethane	10	UJ	D									
Tert-amyl-methyl ether	10	UJ	D									
1,1,1-Trichloroethane	10	UJ	D									
Carbon tetrachloride	10	UJ	D									
Benzene	10	UJ	D									
Trichloroethene	10	UJ	D									
1,2-Dichloropropane	10	UJ	D									
Bromodichloromethane	10	UJ	D									
cis-1,3-Dichloropropene	10	UJ	D									
trans-1,3-Dichloropropene	10	UJ	D									
1,1,2-Trichloroethane	10	UJ	D									
Dibromochloromethane	10	UJ	D									
4-Methyl-2-pentanone	10	UJ	CD	10	UJ	CD	10	UJ	D	10	UJ	D
Toluene	10	UJ	CD	10	UJ	CD	10	UJ	D	10	UJ	D
Tetrachloroethene	10	UJ	CD	10	UJ	CD	10	UJ	D	10	UJ	D
1,3-Dichloropropane	10	UJ	CD	10	UJ	CD	10	UJ	D	10	UJ	D
2-Hexanone	10	UJ	CD	10	UJ	CD	10	UJ	D	10	UJ	D

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

**EPA REGION 9 LABORATORY - RICHMOND, CA  
SUMMARY OF ANALYTICAL RESULTS**

Case: R02S80  
 Site: Belavstegui Park  
 SDG: 02240A  
 Date: 9/26/02  
 Analysis: 8260B  
 Matrix: SOIL

Sample No. Lab Sample ID Date of Collection Units	MW1-S-1 AB36548 8/27/02			MW2-S-1 AB36547 8/27/02			MW3-S-1 AB36549 8/27/02			MW3-S-2 AB36550 8/27/02		
	ug/Kg Result	Q	Cmt									
1,2-Dibromoethane (EDB)	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
Chlorobenzene	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
Ethylbenzene	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
m,p-Xylene	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
o-Xylene	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
Styrene	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
Bromoform	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
1,1,2,2-Tetrachloroethane	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
1,2,3-Trichloropropane	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
1,3-Dichlorobenzene	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
1,4-Dichlorobenzene	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
1,2-Dichlorobenzene	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D
1,2-Dibromo-3-chloropropane	10	UJ	CD	10	UJ	D	10	UJ	D	10	UJ	D

Cmt: Refer to corresponding section in the report narrative for each letter  
 N/A: Not Applicable  
 N/R: Not Reported  
 U: Parameter was analyzed, not detected. Value is quant. limit, adjusted for dilution, if any  
 J: Estimated

KLEINFELDER COASTAL 02-20-05-2

PROJECT NO. 15562.01  
 PROJECT NAME: BELAUSTEGUI PARK  
 RECEIVING LAB: EPA REGION 9 LABORATORY  
 INSTRUCTIONS/REMARKS:

Post-it\* Fax Note 7671  
 Date 12/3/02 # of pages 4  
 To JOSH FORTMAN From FRED C.  
 Co. EPA  
 Phone # 510 412 2323  
 Fax # 510 412 2304

DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D. NUMBER	MATRIX	NO. OF CONTAINERS	TYPE OF CONTAINERS	ANALYSIS
1 9/3/02	1415	MW1-GW-1	WATER	8		X
2 9/3/02	1335	MW2-GW-1	WATER	8		X
3 9/3/02	1457	MW3-GW-1	WATER	8		X
4 9/3/02	1457	MW3-GW-2	WATER	8		X
5 9/3/02	1517	FB-W-1	WATER	8		X
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						

TPH - E AND TPH - G FOR ALL SAMPLES  
 CUST SEALS INTACT  
 RECD @ 600

Relinquished by: (Signature) [Signature]  
 Date/Time 9/4/02 1426  
 Received by: (Signature) [Signature]  
 Date/Time 9/5/02 1056  
 Relinquished by: (Signature) [Signature]  
 Date/Time 9/5/02 1056  
 Received by: (Signature) [Signature]  
 Date/Time 9/5/02 1056  
 Relinquished by: (Signature) [Signature]  
 Date/Time 9/5/02 1056  
 Received by: (Signature) [Signature]  
 Date/Time 9/5/02 1056  
 Relinquished by: (Signature) [Signature]  
 Date/Time 9/5/02 1056  
 Received by: (Signature) [Signature]  
 Date/Time 9/5/02 1056

KL - NF - DE 228-01

PROJECT NO. 15562.01	PROJECT NAME BELAUSTEQUI PARK		DATE MM/DD/YY	SAMPLE ID. HH:MM:SS	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS	TYPE OF CON-TAINERS	ANALYSIS	RECEIVING LAB: EPA REGION 9 LABORATORY	INSTRUCTIONS/REMARKS CHAIN OF Z
	LP NO. (P.O. NO.)	SAMPLERS: (Signature/Number)									
1	8/27/02	0730	MW2-S-5-1	Soil	X						
2	8/27/02	0834	MW1-S-5-1	Soil	X						
3	8/27/02	0935	MW3-S-5-1	Soil	X						
4	8/27/02	0935	MW3-S-5-2	Soil	X						
5	8/27/02	1501	B3-S-1-1	Soil	X						
6	8/27/02	1501	B3-S-1-2	Soil	X						
7	8/27/02	1850	B3-S-5-3	Soil	X						
8	8/24/02	1731	B2-S-1-1	Soil	X						
9	8/24/02	1731	B2-S-1-2	Soil	X						
10	8/24/02	1745	B2-S-4-3	Soil	X						
11	8/28/02	0732	B4-S-3-1	Soil	X						
12	8/28/02	0735	B4-S-4-2	Soil	X						
13	8/28/02	0755	B5-S-3-1	Soil	X						
14	8/28/02	0805	B5-S-4-3	Soil	X						
15	8/26/02	1550	B1-S-2-1	Soil	X						
16	8/26/02	1556	B1-S-5-2	Soil	X						
17	8/28/02	0825	B6-S-2-1	Soil	X						
18	8/28/02	0830	B6-S-4-2	Soil	X						
19	8/28/02	0850	B7-S-3-1	Soil	X						
20	8/28/02	0900	B7-S-5-2	Soil	X						

LOG IN FILE 02082801

02240A

Send Results To:  
KLEINFELDER  
3189 MILL STREET  
RENO, NV 89502  
(702) 323-7182

Instructions/Remarks:  
CASE # R02S80  
CUB. SEALS INTACT  
REC'D 9/30/02 9:50  
8/30/02 9:50

Relinquished by: (Signature) *John F. [Signature]*  
Date/Time: 8/27/02 1510  
Received by: (Signature) *[Signature]*  
Date/Time: [Blank]  
Relinquished by: (Signature) [Blank]  
Date/Time: [Blank]  
Received by: (Signature) *[Signature]*  
Date/Time: [Blank]

PROJECT NO. 15562.01 PROJECT NAME: BELANSTEGNI PART  
 RECEIVING LAB: EPA REGION 9 LABORATORY  
 INSTRUCTIONS/REMARKS: CHAIN 2 OF 2

DATE: 8/28/02  
 SAMPLE ID: BB-S-2-1  
 MATRIX: SOIL  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/28/02  
 SAMPLE ID: BB-S-3-2  
 MATRIX: SOIL  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/28/02  
 SAMPLE ID: B9-S-0-1  
 MATRIX: SOIL  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/28/02  
 SAMPLE ID: B9-S-3-2  
 MATRIX: SOIL  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/28/02  
 SAMPLE ID: B10-S-1-1  
 MATRIX: SOIL  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/28/02  
 SAMPLE ID: B10-S-2-2  
 MATRIX: SOIL  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/26/02  
 SAMPLE ID: RB-W-1  
 MATRIX: WATER  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/27/02  
 SAMPLE ID: RB-W-2  
 MATRIX: WATER  
 NO. OF CON-TAINERS: 8  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/28/02  
 SAMPLE ID: RB-W-3  
 MATRIX: WATER  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

DATE: 8/28/02  
 SAMPLE ID: RB-W-3  
 MATRIX: WATER  
 NO. OF CON-TAINERS: 1  
 TYPE OF CON-TAINERS:   
 ANALYSIS: TOTAL PA (70) X, TPLP BA (131) X, VEC (B2C0B) X, TPL (B015B) X

RELIQUISHED BY: (Signature) *John F. [Signature]* DATE/TIME: 8/29/02 1510  
 RECEIVED BY: (Signature) *[Signature]* DATE/TIME:   
 INSTRUCTIONS/REMARKS: CASE # R02580, CUST SEALS INTACT, REC'D @ 3:00 PM, 8/30/02 9:50  
 SEND RESULTS TO: KLEINFELDER, 3189 MILL STREET, RENO, NV 89502, (702) 323-7182  
 ALTR:   
 CHAIN OF CUSTODY  
 WHITE - SAMPLER  
 M-60

KLEINFELDER 02003001

PROJECT NO.		PROJECT NAME		ANALYSIS		RECEIVING LAB:	
15562.01		BELANESQUI PARK		02003001		USEPA Region 9 LABORATORY	
LP NO. (P.O. NO.)		SAMPLERS: (Signature/Number)		NO. OF CON-TAINERS		TYPE OF CON-TAINERS	
02003001		John J. [Signature]		3		3	
DATE	SAMPLE I.D.	SAMPLE I.D.	MATRIX	NO. OF CON-TAINERS		TYPE OF CON-TAINERS	
MM/DD/YY	HH-MM-SS						
1	8/27/02	0730	MW2-S-5-1	SOIL	3	3	3
2	8/27/02	0834	MW1-S-5-1	SOIL	3	3	3
3	8/27/02	0935	MW3-S-5-1	SOIL	3	3	3
4	8/27/02	0940	MW3-S-5-2	SOIL	3	3	3
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							

INSTRUCTIONS/REMARKS  
SWIPA METHOD  
SAMPLES COLLECTED IN NV

INSTRUCTIONS/REMARKS  
CASE #: ROZ500  
SAMPLES RECD @ 1°C, SEALS  
INITIAL  
LQD 8/28/02

Send Results To:  
KLEINFELDER  
3189 MILL STREET  
RENO, NV 89502  
(702) 323-7182

Attic:

Return Copy To Shipper  
Car

White - Sampler

Pink - Lab Copy

NO 1578

CHAIN OF CUSTODY

M-60



**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP:** 02242A  
**PROGRAM:** SUPERFUND  
**DOCUMENT CONTROL #:** B0101126-1960  
**DATE:** 09/26/02  
**ANALYSIS:** METALS  
**SAMPLE NUMBERS:**

<u>SAMPLE ID</u>	<u>LABORATORY SAMPLE ID</u>
B8-S-2-1	AB36599
B8-S-3-2	AB36600
B9-S-0-1	AB36601
B9-S-3-2	AB36602
B10-S-1-1	AB36603
B10-S-2-2	AB36604

**GENERAL COMMENTS**

Six soil samples were received from the Belavstegui Park Superfund project on 08/30/02.

All samples were analyzed for barium following method based on EPA Method 6010. All samples were analyzed within the required 180-day holding time. Results are reported in mg/Kg dry weight.

**SAMPLE RECEIPT AND PRESERVATION**

No shipping or preservation issues were encountered with these samples.

**QC COMMENTS**

No barium was detected in the LRB associated with this sample delivery group.

The LFM and LFM duplicate recoveries were within the 70-130% QC limits.

The relative percent difference (RPD) between the LFM and LFM duplicate for barium was within the 20 % QC limit.

The barium LFB recovery was within the 85-115% QC limits.

Questions concerning the data can be answered by Osell Salvador at (510) 412-2358.

## GLOSSARY

### Laboratory Reagent Blanks (LRB)

A laboratory reagent blank is laboratory reagent water or baked sand with all reagents added and carried through the same sample preparation and analytical procedures as the field samples. The laboratory reagent blank is used to determine the level of contamination introduced by the laboratory during analysis.

### Laboratory Fortified Matrix (LFM) and Laboratory Fortified Matrix Duplicate (LFMD) Analysis

Laboratory fortified matrix and laboratory fortified matrix duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample nonhomogeneity in soils, or matrix effects which may interfere with analysis.

### Laboratory Fortified Blank (LFB) Analysis

The laboratory fortified blank sample is laboratory reagent water or baked sand with a known concentration of the analytes of interest added by the laboratory with all reagents added and carried through the same sample preparation and analytical procedures as the field samples. Poor percent recovery (%R) results may indicate inconsistent laboratory technique.

Additional Comments: R02S80, SDG 02242A, Barium

ICP Calculation:

$$\text{Conc. (mg/Kg)} = \frac{\text{ICP reading in mg/L} \times \text{(final volume of 0.2 L)} \times \text{(dilution factor, if any)}}{\text{(weight in grams)} \times (1 \text{ Kg} / 1000 \text{ grams}) \times (\% \text{ solids} / 100)}$$

**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP:** 02240A  
**PROGRAM:** SUPERFUND  
**DOCUMENT CONTROL #:** B0101126-1958  
**DATE:** 09/26/02  
**ANALYSIS:** METALS  
**SAMPLE NUMBERS:**

<u>SAMPLE ID</u>	<u>LABORATORY SAMPLE ID</u>
B3-S-1-1	AB36583
B3-S-1-2	AB36584
B3-S-5-3	AB36585
B2-S-1-1	AB36586
B2-S-1-2	AB36587
B2-S-4-3	AB36588
B4-S-3-1	AB36589
B4-S-4-2	AB36590
B5-S-3-1	AB36591
B5-S-4-3	AB36592
B1-S-2-1	AB36593
B1-S-5-2	AB36594
B6-S-2-1	AB36595
B6-S-4-2	AB36596
B7-S-3-1	AB36597
B7-S-5-2	AB36598

**GENERAL COMMENTS**

Sixteen soil samples were received from the Belavstegui Park Superfund project on 08/30/02.

All samples were analyzed for barium following method based on EPA Method 6010. All samples were analyzed within the required 180-day holding time. Results are reported in mg/Kg dry weight.

**SAMPLE RECEIPT AND PRESERVATION**

No shipping or preservation issues were encountered with these samples.

**QC COMMENTS**

No barium was detected in the LRB associated with this sample delivery group.

The LFM and LFM duplicate recoveries were within the 70-130% QC limits.

The relative percent difference (RPD) between the LFM and LFM duplicate for barium was within the 20% QC limit.

The barium LFB recovery was within the 85-115% QC limits.

Questions concerning the data can be answered by Osell Salvador at (510) 412-2358.

## GLOSSARY

### Laboratory Reagent Blanks (LRB)

A laboratory reagent blank is laboratory reagent water or baked sand with all reagents added and carried through the same sample preparation and analytical procedures as the field samples. The laboratory reagent blank is used to determine the level of contamination introduced by the laboratory during analysis.

### Laboratory Fortified Matrix (LFM) and Laboratory Fortified Matrix Duplicate (LFMD) Analysis

Laboratory fortified matrix and laboratory fortified matrix duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample nonhomogeneity in soils, or matrix effects which may interfere with analysis.

### Laboratory Fortified Blank (LFB) Analysis

The laboratory fortified blank sample is laboratory reagent water or baked sand with a known concentration of the analytes of interest added by the laboratory with all reagents added and carried through the same sample preparation and analytical procedures as the field samples. Poor percent recovery (%R) results may indicate inconsistent laboratory technique.

Additional Comments: R02S80, SDG 02240A, Barium

ICP Calculation:

$$\text{Conc. (mg/Kg)} = \frac{(\text{ICP reading in mg/L}) \times (\text{final volume of 0.2 L}) \times (\text{dilution factor, if any})}{(\text{weight in grams}) \times (1 \text{ Kg} / 1000 \text{ grams}) \times (\% \text{ solids} / 100)}$$



Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02240A  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: Soil

Sample No. Lab Sample I.D. Collection Date Units	CAS #	EPA Method	B2-S-4-3 AB36588 8/26/02 mg/kg	B4-S-3-1 AB36589 8/28/02 mg/kg	B4-S-4-2 AB36590 8/28/02 mg/kg	B5-S-3-1 AB36591 8/28/02 mg/kg	B5-S-4-3 AB36592 8/28/02 mg/kg
Analyte			Result	Result	Result	Result	Result
Barium	7440-39-3	6010B	220	870	170	180	100
Solids, %	7732-18-5		88%	93%	93%	90%	93%
			Q	Com	Q	Com	Q
							Com

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.



Site: Belavstegui Park  
 Case: R02580  
 SDG: 02740A  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: Soil

Sample No.	Lab Sample I.D.	Collection Date	Units	CAS#	EPA Method	Result	Q	Com	LRB Reagent Blank	Method QL
	B7-S-5-2	AB36598	mg/kg							
		8/28/02								
Analyte										
Barium				7440-39-3	6010B	80			mg/kg	QL
Solids, %				7732-18-5		91%			Result	10
									100%	

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.



Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02Z42A  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: Soil

Sample No.	Lab Sample I.D.	EPA Method	CAS #	Result	Q	Com	LRB Reagent Blank	Method QL
	B10-S-2-2 AB36604	6010B	7440-39-3	1900			mg/kg Result 10	mg/kg QL 10
			7732-18-5	92%			100%	N/A

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.

**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP:** 02242C / 02242D  
**PROGRAM:** SUPERFUND  
**DOCUMENT CONTROL #:** B0101126-1957  
**DATE:** 09/26/02  
**ANALYSIS:** METALS  
**SAMPLE NUMBERS:**

<b><u>SAMPLE ID</u></b>	<b><u>LABORATORY SAMPLE ID</u></b>
B3-S-1-1 TC	AB36608
B3-S-1-2 TC	AB36609
B3-S-5-3 TC	AB36610
B2-S-1-1 TC	AB36611
B2-S-1-2 TC	AB36612
B2-S-4-3 TC	AB36613
B4-S-3-1 TC	AB36614
B4-S-4-2 TC	AB36615
B5-S-3-1 TC	AB36616
B5-S-4-3 TC	AB36617
B1-S-2-1 TC	AB36618
B1-S-5-2 TC	AB36619
B6-S-2-1 TC	AB36620
B6-S-4-2 TC	AB36621
B7-S-3-1 TC	AB36622
B7-S-5-2 TC	AB36623
B8-S-2-1 TC	AB36624
B8-S-3-2 TC	AB36625
B9-S-0-1 TC	AB36626
B9-S-3-2 TC	AB36627
B10-S-1-1 TC	AB36628
B10-S-2-2 TC	AB36629

**GENERAL COMMENTS**

Twenty-two soil samples were received from the Belavstegui Park Superfund project on 08/30/02.

The requested analyses were toxicity characteristic leaching procedure (TCLP) sample extraction by EPA Method 1311 followed by RCRA barium analyses by Region 9 Laboratory SOP #505 (EPA Method 200.7). Samples were extracted within the required 28-day holding time and were analyzed within the required 180-day holding time.

**SAMPLE RECEIPT AND PRESERVATION**

No shipping or preservation issues were encountered with these samples.

**TCLP EXTRACTION COMMENTS**

Examination of all samples showed no obvious liquid fraction and that the samples were considered 100% solid. Samples AB36608, AB36609, AB36611, AB36614, AB36615, AB36617, AB36620, AB36621, AB36622, AB36623, AB36624, AB36625, AB36626, AB36628 and AB36629 were extracted with extraction fluid #1. Samples AB36610, AB36612, AB36613, AB36616, AB36618, AB36619 and AB36627 were extracted with extraction fluid #2.

## QC COMMENTS

The following comment appears on the Summary of Analytical Results:

1. All detected results less than the quantitation limit (QL) are estimated (J).

Barium is a common contaminant in the filter. The barium QL has been raised to 4 mg/L.

No analytes were detected in the LRBs associated with this sample delivery group.

All LFM and LFM duplicate recoveries were within the 70-130% QC limits.

The relative percent differences (RPDs) between the LFM and LFM duplicate for barium were within the 20 % QC limit.

The RPDs between the sample and sample duplicate for barium were within the 20% QC limit.

All LFB recoveries were within the 85-115% QC limits.

Questions concerning the data can be answered by Osell Salvador at (510) 412-2358.

## GLOSSARY

### Laboratory Reagent Blanks (LRB)

A laboratory reagent blank is laboratory reagent water or baked sand with all reagents added and carried through the same sample preparation and analytical procedures as the field samples. The laboratory reagent blank is used to determine the level of contamination introduced by the laboratory during analysis.

### Laboratory Fortified Matrix (LFM) and Laboratory Fortified Matrix Duplicate (LFMD) Analysis

Laboratory fortified matrix and laboratory fortified matrix duplicate analyses provide information about the effect of the sample matrix on sample preparation and measurement. Poor percent recovery (%R) results and large relative percent difference (RPD) between duplicates may indicate inconsistent laboratory technique, sample nonhomogeneity in soils, or matrix effects which may interfere with analysis.

### Laboratory Fortified Blank (LFB) Analysis

The laboratory fortified blank sample is laboratory reagent water or baked sand with a known concentration of the analytes of interest added by the laboratory with all reagents added and carried through the same sample preparation and analytical procedures as the field samples. Poor percent recovery (%R) results may indicate inconsistent laboratory technique.

Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02242C / 02242D  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: TC Leachate

Sample No.	Lab Sample I.D.	Collection Date	Units	Analyte	CAS #	EPA Method	Result	Q	Com	Q	Com	Result	Q	Com
B3-S-1-1 TC	AB36608	8/27/02	mg/L	Barium	7440-39-3	200.7	4	U						
B3-S-1-2 TC	AB36609	8/27/02	mg/L				4	U						
B3-S-5-3 TC	AB36610	8/27/02	mg/L				4	U						
B2-S-1-1 TC	AB36611	8/26/02	mg/L				2		J		A			
B2-S-1-2 TC	AB36612	8/26/02	mg/L				2		J		A			

Com - Comments refer to the corresponding section in the report narrative for each letter.  
 N/A - Not Applicable.  
 N/R - Not Required.  
 Q - Refer to data qualifiers.  
 U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.  
 J - The associated value is an estimated quantity.

Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02242C / 02242D  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: TC Leachate

Sample No.	Lab Sample I.D.	Collection Date	Units	Result	Q	Com	Result	Q	Com
	B2-S-4-3 TC	AB36613	8/26/02	mg/L	4	U			
	B4-S-3-1 TC	AB36614	8/28/02	mg/L	4	U			
	B4-S-4-2 TC	AB36615	8/28/02	mg/L	4	U			
	B5-S-3-1 TC	AB36616	8/28/02	mg/L	4	U			
	B5-S-4-3 TC	AB36617	8/28/02	mg/L	4	U			
Analyte	CAS #	EPA Method	Result	Q	Com	Result	Q	Com	
Barium	7440-39-3	200.7							

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.

Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02242C / 02242D  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: TC Leachate

Sample No.	Lab Sample I.D.	Collection Date	Units	CAS #	EPA Method	Result	Q	Com	Q	Com	Result	Q	Com
	B1-S-2-1 TC	AB36618	mg/L	7440-39-3	200.7	2							
	B1-S-2-1 TC	AB36619	mg/L			4							
	B6-S-2-1 TC	AB36620	mg/L			4							
	B6-S-4-2 TC	AB36621	mg/L			4							
	B7-S-3-1 TC	AB36622	mg/L			4							

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.

Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02242C / 02242D  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: TC Leachate

Sample No.	Lab Sample I.D.	Collection Date	Units	Analysis	EPA Method	CAS #	Result	Q	Com	Q	Com	Q	Com
	B7-S-5-2 TC	AB36623	8/28/02	mg/L	200.7	7440-39-3	4	U					
	B8-S-2-1 TC	AB36624	8/28/02	mg/L			4	U					
	B8-S-3-2 TC	AB36625	8/28/02	mg/L			4	U					
	B9-S-0-1 TC	AB36626	8/28/02	mg/L			2		J		A		
	B9-S-3-2 TC	AB36627	8/28/02	mg/L			4					U	

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.

Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02242C/02242D  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: TC Leachate

Sample No. Lab Sample I.D. Collection Date Units	CAS #	EPA Method	B10-S-1-1 TC		B10-S-2-2 TC		LRB Reagent Blank		Extract Blank #1 Fluid #1		Extract Blank #2 Fluid #2	
			AB36628 8/28/02 mg/L	Result	Q	Com	AB36629 8/28/02 mg/L	Result	Q	Com	mg/L	Result
Barium	7440-39-3	200.7	4	U	4	U	4	U	4	U	4	U

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.

Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02242C/02242D  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: TC Leachate

Sample No. Lab Sample I.D. Collection Date	EPA Method	Extract Blank 3 Fluid #1		Method QL	RCRA Limit
		mg/L Result	mg/L QL		
Units					
Analyte	CAS #	Q	Com		
Barium	7440-39-3	4	U	4	100

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.

Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02242C / 02242D  
 Date: 09/26/02  
 Analysis: Metals  
 Matrix: TC Leachate

Sample No. Lab Sample I.D. Collection Date Units	CAS #	EPA Method	LRB Reagent Blank		Method QL
			mg/L Result	Q Com	
Barium	7440-39-3	200.7	4	U	4

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.

**USEPA REGION 9 LABORATORY**  
**REPORT NARRATIVE**

**CASE NUMBER:** R02S80  
**SAMPLE DELIVERY GROUP:** 02242B  
**PROGRAM:** SUPERFUND  
**DOCUMENT CONTROL #:** B0101126-1953  
**DATE:** 09/25/02  
**ANALYSIS:** METALS  
**SAMPLE NUMBERS:**

<u>SAMPLE ID</u>	<u>LABORATORY SAMPLE ID</u>
RB-W-1	AB36605
RB-W-3	AB36607

**GENERAL COMMENTS**

Two water samples were received from the Belavstegui Park Superfund project on 08/30/02.

The samples were analyzed for barium using Region 9 Laboratory SOP #505 (EPA Method 200.7). Both samples were analyzed within the 180-day holding time.

**SAMPLE RECEIPT AND PRESERVATION**

No shipping or preservation issues were encountered with these samples.

**QC COMMENTS**

No barium was detected in the LRB associated with this sample delivery group.

The LFM and LFM duplicate recoveries were within the 70-130% QC limits.

The RPD between the LFM and LFM duplicate was within the 20% QC limit.

The LFB recovery was within the 85-115% QC limits.

Questions concerning the data can be answered by Oseli Salvador at (510) 412-2358.

## GLOSSARY

### Laboratory Reagent Blanks (LRB)

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### Laboratory Fortified Blank (LFB) Analysis

The laboratory fortified blank sample is laboratory reagent water or baked sand with a known concentration of the analytes of interest added by the laboratory with all reagents added and carried through the same sample preparation and analytical procedures as the field samples. Poor percent recovery (%R) results may indicate inconsistent laboratory technique.

Site: Belavstegui Park  
 Case: R02S80  
 SDG: 02242B  
 Date: 09/25/02  
 Analysis: Metals  
 Matrix: Water

Sample No. Lab Sample I.D. Collection Date Units	CAS #	EPA Method	RB-W-1 AB36605 8/26/02 ug/L	RB-W-3 AB36607 8/28/02 ug/L	LRR Reagent Blank ug/L	Method QL ug/L
Result	Q	Com	Result	Q	Com	QL
7440-39-3		200.7	40	20	10	10
					U	

Com - Comments refer to the corresponding section in the report narrative for each letter.

N/A - Not Applicable.

N/R - Not Required.

Q - Refer to data qualifiers.

U - Parameter analyzed, but not detected; associated value is quantitation limit, adjusted for dilution.

J - The associated value is an estimated quantity.

**APPENDIX D**

**EPA Region 9 PRG Table**



## U.S. Environmental Protection Agency

### Region 9: Superfund

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## Preliminary Remediation Goals: What's New in 2002

October 1, 2002

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The PRGs table contains over 600 preliminary remediation goals (PRGs) for contaminants in soil, air, and tap water. Region 9 PRGs are risk-based concentrations that are intended to assist risk assessors and others in initial screening-level evaluations of environmental measurements. As their name implies, Region 9 PRGs may also be viewed as preliminary cleanup goals for an individual chemical, but in this context, they are best viewed as dynamic and subject to change because they are generic and based on direct contact exposures which may not address site-specific conditions and/or indirect exposure pathways at sites (See Exhibit 1-1 in "Region 9 PRGs Table Users Guide/Technical Background Document").

Also for planning purposes, these human health based PRGs should always be considered in conjunction with ARAR-based PRGs (e.g. MCLs), ecological benchmarks, and "background" conditions before establishing a final cleanup level for a particular site.

We view risk-based PRGs as "evergreen". Ongoing changes to the PRGs reflect continuing improvements in our scientific knowledge base and state-of-the-art approaches to risk assessment. In the new Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites (Supplemental SSL Guidance, EPA 2001a), two different soil ingestion rates are assumed for nonconstruction workers: 100 mg/day is assumed for outdoor workers whereas 50 mg/day is assumed for indoor workers. The default value of 100 mg/day for outdoor workers is also recommended by EPA's Technical Review Workgroup for Lead (TRW), and it reflects increased exposures to soils for outdoor workers relative to their indoor counterparts. For more on this, please see Section 4.1 of the "Region 9 PRGs Table Users Guide/Technical Background Document" or refer to the [Supplemental SSL Guidance](#).

Because the Region 9 PRGs are generic and intended for screening sites early in the investigation process (often before site-specific information is available), we have chosen to use the 100 mg/day soil ingestion (i.e. outdoor worker) assumption to calculate industrial soil PRGs. Please note that previous issues of the Region 9 PRGs table assumed 50 mg/day soil ingestion rate for workers. This change in soil ingestion rates is reflected in a somewhat lower (more stringent) industrial soils PRG for many contaminants. The appropriateness of this assumption for a particular site may be evaluated when additional information becomes available regarding site conditions or site development. In addition to changes in exposure factor assumptions, several chemicals have new or revised toxicity values that results in changes to the PRG calculations.

To facilitate the user's review, chemicals with new and revised toxicological criteria are presented in bold in the 2002 table and also listed here for convenience: acetonitrile, benzyl chloride, boron, bromate, 1,3-butadiene, 1-butanol, butylbenzenes, cacodylic acid, cadmium (California State value), chloroform, chloronitrobenzenes, chrysene (California State value), cobalt, 1,2-dibromo-3-chloropropane (California State value), 1,1-dichloroethylene, diethylene glycol ethers, diethylformamide, dinitrobenzenes, di-n-octyl phthalate, diphenyl sulfone, ethylbenzene, HCH, hexachlorocyclopentadiene, kepone, lead (California State value), MTBE, 2-nitroaniline, carcinogenic PAHs, perchlorate, polychlorinated terphenyls, benzo(k)fluoranthene (California State value), propylbenzene, propylene glycol, quinoline, tetrachloroethylene, tetrahydrofuran, thiocyanate, 1,1,1-trichloroethane, trichloroethylene, 2,4,6-trichlorophenol, 1,2,3-trichloropropane, triphenylphosphine oxide, tris(2-chloroethyl) phosphate, vinyl chloride, and xylene.

Also in this update to the "Region 9 PRGs Table User's Guide/Technical Background Document", we have added a brief discussion of special case chemicals for which an alternate approach was applied in the derivation of the Region 9 PRGs (Section 2.3). Increasingly, chemical-specific approaches are being used that do not lend themselves to a single PRG model. Special case chemicals that are discussed include: cadmium, chromium 6, lead, manganese, nitrate/nitrite, thallium, and vinyl chloride.

Finally, it should be recognized by all that use the PRGs table that not all PRG values in the table are "created equal". For some chemicals, a robust data set exists upon which the toxicological criteria are based whereas for others, there may be relatively few studies that form the basis of the PRG calculation. Also, PRGs for some chemicals are based on withdrawn toxicity values or route extrapolated values. Withdrawn and route-extrapolated numbers are shown in the table because we still need to deal with these contaminants during the long delays before replacement numbers are ready. Please consult with your toxicologist or agency risk assessor to best address potential uncertainties associated with chemical-specific PRGs, especially if the chemical is a risk driver at your site.

As with any risk-based tool, there exists the potential for misuse. We try to highlight potential problems in Section 3.8. However, it should be noted that the use of PRGs at a particular site becomes the responsibility of the user. It is recommended that the user verify the numbers with an agency toxicologist or risk assessor because the toxicity / exposure information in the table may contain errors or default assumptions that need to be refined based on further evaluation. If you find an error please contact Stan Smucker via e-mail at [smucker.stan@epa.gov](mailto:smucker.stan@epa.gov).

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Last updated on Thursday, October 3rd, 2002  
URL: <http://www.epa.gov/Region9/waste/sfund/prg/whatsnew.htm>

Key : Sfo=Cancer Slope Factor oral, Inhalation RfDo=(Reference Dose oral, Inhalation (IRIS h=HEAST n=NCEA x=Withdrawn o=Other EPA Source r=Route-extrapolation ca=Cancer PRG nc=Noncancer PRG ca\*\* where: nc < 100X ca) ca\*\* where: nc < 10X ca)  
 +---+Non-Standard Method Applied (See Section 2.3 of the "Region 9 PRGs Table Users Guide") s=Soil Saturation (See Section 4.5) max=Caching limit (See Section 2.1) DAF=Dilution Attenuation Factor (See Section 2.5) CAS=Chemical Abstract Services

TOXICITY INFORMATION										CONTAMINANT				PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
Sfo	RfDo	SFI	RfDi	V	CAS No.	Direct Contact Exposure Pathways				Ambient Air		Tap Water	DAF 20	DAF 1					
1/(mg/kg-d)	(mg/kg-d)	1/(mg/kg-d)	(mg/kg-d)	skin		Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Soil (mg/kg)	(ug/m <sup>3</sup> )	(ug/l)	(mg/kg)	(mg/kg)	Migration to Ground Water						
				O abs.															
8.7E-03	4.0E-03	8.7E-03	4.0E-03	r 0	30680-19-1	5.6E+01	2.0E+02	ca*	7.7E-01	ca*	7.7E+00	ca*							
		7.7E-03	2.8E-03	i 1	75-07-0	1.1E+01	2.3E+01	ca**	8.7E-01	ca*	1.7E+00	ca							
	2.0E-02		2.0E-02	r 0	34258-82-1	1.2E+03	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc							
	1.0E-01		1.0E-01	r 1	67-64-1	1.6E+03	6.0E+03	nc	3.7E+02	nc	6.1E+02	nc	1.5E+01	8.0E-01					
	8.0E-04		8.0E-04	r 0	75-86-5	4.9E+01	4.9E+02	nc	2.9E+00	nc	2.9E+01	nc							
	1.7E-02		1.7E-02	i 1	75-05-8	4.2E+02	1.8E+03	nc	6.2E+01	nc	1.0E+02	nc							
	2.0E-02		5.7E-06	i 1	107-02-8	1.0E-01	3.4E-01	nc	2.1E-02	nc	4.2E-02	nc							
4.9E+00	2.0E-04	4.9E+00	2.0E-04	r 0	79-06-1	1.1E-01	3.8E-01	ca	1.5E-03	ca	1.5E-02	ca							
	5.0E-01		2.9E-04	i 0	79-10-7	2.9E+04	1.0E+05	max	1.0E+00	nc	1.8E+04	nc							
5.4E-01	1.0E-03	2.4E-01	5.7E-04	i 1	107-13-1	2.1E-01	4.9E-01	ca*	2.8E-02	ca*	3.9E-02	ca*							
8.1E-02	1.0E-02	8.0E-02	1.0E-02	r 0	19972-60-8	6.0E+00	2.1E+01	ca	8.4E-02	ca	8.4E-01	ca							
	1.5E-01		1.5E-01	r 0	1596-84-5	9.2E+03	9.2E+04	nc	5.5E+02	nc	5.5E+03	nc							
	1.0E-03		1.0E-03	r 0	116-06-3	6.1E+01	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc							
	1.0E-03		1.0E-03	r 0	1646-88-4	6.1E+01	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc							
1.7E+01	3.0E-05	1.7E+01	3.0E-05	r 0	309-00-2	2.9E-02	1.0E-01	ca*	3.9E-04	ca	4.0E-03	ca	5.0E-01	2.0E-02					
	2.5E-01		2.5E-01	r 0	74223-84-6	1.5E+04	1.0E+05	max	9.1E+02	nc	9.1E+03	nc							
	5.0E-03		5.0E-03	r 0	107-18-6	3.1E+02	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc							
	5.0E-02		2.9E-04	i 0	107-05-1	3.0E+03	3.0E+04	nc	1.0E+00	nc	1.8E+03	nc							
	1.0E+00		1.4E-03	n 0	7429-90-5	7.6E+04	1.0E+05	max	5.1E+00	nc	3.6E+04	nc							
	4.0E-04		3.0E-04	r 0	20859-73-8	3.1E+01	4.1E+02	nc	1.1E+00	nc	1.5E+01	nc							
	3.0E-04		3.0E-04	r 0	67485-29-4	1.8E+01	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc							
	9.0E-03		9.0E-03	r 0	834-12-8	5.5E+02	5.5E+03	nc	3.3E+01	nc	3.3E+02	nc							
	7.0E-02		7.0E-02	r 0	591-27-5	4.3E+03	4.3E+04	nc	2.6E+02	nc	2.6E+03	nc							
	2.0E-05		2.0E-05	r 0	504-24-5	1.2E+00	1.2E+01	nc	7.3E-02	nc	7.3E-01	nc							
	2.5E-03		2.5E-03	r 0	33089-61-1	1.5E+02	1.5E+03	nc	9.1E+00	nc	9.1E+01	nc							
	2.0E-01		2.9E-02	i 0	7664-41-7	1.2E+04	1.0E+05	max	1.0E+02	nc	7.3E+03	nc							
5.7E-03	7.0E-03	5.7E-03	2.9E-04	i 0	62-53-3	8.5E+01	3.0E+02	ca*	1.0E+00	nc	1.2E+01	ca*							
	4.0E-04		4.0E-04	i 0	7440-36-0	3.1E+01	4.1E+02	nc		nc	1.5E+01	nc	5.0E+00	3.0E-01					
	5.0E-04		5.0E-04	h 0	1314-80-9	3.9E+01	5.1E+02	nc		nc	1.8E+01	nc							
	9.0E-04		9.0E-04	h 0	28300-74-5	7.0E+01	9.2E+02	nc		nc	3.3E+01	nc							
	4.0E-04		4.0E-04	h 0	1332-81-6	3.1E+01	4.1E+02	nc		nc	1.5E+01	nc							
	4.0E-04		5.7E-05	i 0	1309-84-4	3.1E+01	4.1E+02	nc	2.1E-01	nc	1.5E+01	nc							
	1.3E-02		1.3E-02	r 0	74115-24-5	7.9E+02	8.0E+03	nc	4.7E+01	nc	4.7E+02	nc							
2.5E-02	5.0E-02	2.5E-02	5.0E-02	r 0	140-57-8	1.9E+01	6.9E+01	ca	2.7E-01	ca	2.7E+00	ca							
	3.0E-04		3.0E-04	i 0	7440-38-2	2.2E+01	2.6E+02	nc		nc									

Key: SFO, (Cancer Slope Factor oral, inhalation, RfD)=Reference Dose oral, inhalation (IRIS H=HEAST, X=Withdrawn, O=Other EPA Source, R=Route-Extrapolation, ca=Cancer PRG, nc=Noncancer PRG, ca\*\* (where: nc < 100X ca) \*\* (where: nc < 10X ca) \*\*\*=Non-Standard Method Applied (See Section 2.3 of the "Region 9 PRGs Table User's Guide"), soil=Soil Saturation (See Section 4.5), max=Calling Limit (See Section 2.1), DAF=Dilution Attenuation Factor (See Section 2.5), CAS=Chemical Abstract Services

TOXICITY INFORMATION				CONTAMINANT				PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFO 1/(mg/kg-d)	RfD (mg/kg-d)	SFI 1/(mg/kg-d)	RfD (mg/kg-d)	V	CAS No.	Contaminant	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m <sup>3</sup> )	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)	
				O atms. C soils							*Migration to Ground Water		
1.5E+00	3.0E-04	1.3E+01	1.4E-06	0	7440-38-2	Arsenic (cancer endpoint)	3.9E-01	1.6E+00	4.5E-04	4.5E-02	2.9E+01	1.0E+00	
			1.4E-06	0	7784-42-1	Arsine (see arsenic for cancer endpoint)	5.5E+02	5.5E+03	3.3E+01	3.3E+02			
			9.0E-03	0	76578-12-6	Assure	3.1E+03	3.1E+04	1.8E+02	1.8E+03			
			5.0E-02	0	3337-71-1	Asulam	2.2E+00	7.8E+00	3.1E-02	3.0E-01			
2.2E-01	3.5E-02	2.2E-01	3.5E-02	0	1912-24-9	Atrazine	2.4E+01	2.5E+02	1.5E+00	1.5E+01			
			4.0E-04	0	71751-41-2	Avemectin B1	4.4E+00	1.6E+01	6.2E-02	6.1E-01			
			1.4E-04	0	103-33-3	Azobenzene	5.4E+03	6.7E+04	5.2E-01	2.6E+03	1.6E+03	8.2E+01	
			4.0E-03	0	7440-39-3	Barium and compounds	2.4E+02	2.5E+03	1.5E+01	1.5E+02			
			3.0E-02	0	43121-43-3	Bayleton	1.8E+03	1.8E+04	1.1E+02	1.1E+03			
			2.5E-02	0	6939-37-6	Baythroid	1.5E+03	1.5E+04	9.1E+01	9.1E+02			
			3.0E-01	0	1861-40-1	Benefin	1.8E+04	1.0E+05	1.1E+03	1.1E+04			
			5.0E-02	0	17904-35-2	Benomyl	3.1E+03	3.1E+04	1.8E+02	1.8E+03			
			3.0E-02	0	25057-89-0	Benlazon	1.8E+03	1.8E+04	1.1E+02	1.1E+03			
			1.0E-01	0	100-52-7	Benzaldehyde	6.1E+03	6.2E+04	3.7E+02	3.6E+03	3.0E-02	2.0E-03	
5.5E-02	3.0E-03	2.9E-02	1.7E-03	0	71-43-2	Benzene	6.0E-01	1.3E+00	2.3E-01	3.4E-01			
2.3E-02	3.0E-03	2.3E+02	3.0E-03	0	92-87-5	Benzidine	2.1E-03	7.5E-03	2.9E-05	2.9E-04	4.0E+02	2.0E+01	
			4.0E+00	0	65-85-0	Benzoic acid	1.0E+05	1.0E+05	1.5E+04	1.5E+05			
			3.0E-01	0	98-07-7	Benzotrifluoride	3.7E-02	1.3E-01	5.2E-04	5.2E-03			
			3.0E-01	0	100-51-8	Benzyl alcohol	1.8E+04	1.0E+05	1.1E+03	1.1E+04			
			2.9E-03	0	100-44-7	Benzyl chloride	8.9E-01	2.2E+00	4.0E-02	6.6E-02	6.3E+01	3.0E+00	
			5.7E-06	0	7440-41-7	Beryllium and compounds	1.5E+02	1.9E+03	8.0E-04	7.3E+01			
			1.0E-04	0	141-66-2	Bifenthrin	6.1E+00	6.2E+01	3.7E-01	3.8E+00			
			1.5E-02	0	82657-04-3	Biphenthrin (Talstar)	9.2E+02	9.2E+03	5.5E+01	5.5E+02			
			5.0E-02	0	92-52-4	1,1-Biphenyl	3.5E+02	3.5E+02	1.8E+02	3.0E+02			
			3.5E-02	0	111-44-4	Bis(2-chloroethoxy)ether	2.1E-01	5.5E-01	5.8E-03	9.8E-03	4.0E-04	2.0E-05	
			4.0E-02	0	39638-32-9	Bis(2-chloroisopropoxy)ether	2.9E+00	7.4E+00	1.9E-01	2.7E-01			
			2.2E+02	0	542-88-1	Bis(chloromethyl)ether	1.9E-04	4.3E-04	3.1E-05	5.2E-05			
			3.5E-02	0	108-90-1	Bis(2-chloro-1-methylethoxy)ether	2.9E+00	7.4E+00	1.9E-01	2.7E-01			
			2.2E-02	0	117-81-7	Bis(2-ethoxyhexyl)phthalate (DEHP)	3.5E+01	1.2E+02	4.8E-01	4.8E+00			
			5.0E-02	0	80-05-7	Bisphenol A	3.1E+03	3.1E+04	1.8E+02	1.8E+03			
			5.7E-03	0	7440-42-8	Boron	1.6E+04	1.0E+05	7.3E-01	7.3E+03			
			2.0E-04	0	7637-07-2	Boron trifluoride	3.1E+02	4.1E+03	0.0E+00	1.5E+02			
			2.9E-03	0	15541-45-4	Bromate	2.8E+01	9.2E+01	1.0E+01	2.0E+01			
			2.0E-02	0	108-96-1	Bromobenzene	8.2E-01	1.8E+00	1.1E-01	1.8E-01	6.0E-01	3.0E-02	
			6.2E-02	0	75-27-4	Bromodichloromethane							





Key: SFO=Cancer Slope Factor oral, Inhalation RfD, I=Reference Dose oral, Inhalation ICRIS I=HEAST I=NCEA W=Withdrawn e=Other EPA Source e=Route-extrapolation ca=Cancer PRG nc=Noncancer PRG ca\* (Where: nc < 100X ca) ca\*\* (Where: nc < 10X ca) \*\*\*=Non-Standard Method Applied (See Section 2.3 of the "Region 9 PRGs Table User's Guide") set=Soil Saturation (See Section 4.5) max=Calling limit (See Section 2.1) DAF=Dilution Attenuation Factor (See Section 2.5) CAS=Chemical Abstract Services

TOXICITY INFORMATION				CONTAMINANT				PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS		
SFO 1/(mg/kg-d)	RfDo (mg/kg-d)	SFI 1/(mg/kg-d)	RfDI (mg/kg-d)	V	CAS No.	Contaminant	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m <sup>3</sup> )	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)		
				skin O abs. C								Migration to Ground Water*		
4.0E-02	I	4.0E-02	r	1	460-19-5	Cyanogen	1.3E+02	nc	4.3E+02	nc	1.5E+02	nc	2.4E+02	nc
9.0E-02	I	9.0E-02	r	1	506-68-3	Cyanogen bromide	2.9E+02	nc	9.7E+02	nc	3.3E+02	nc	5.5E+02	nc
5.0E-02	I	5.0E-02	r	1	506-77-4	Cyanogen chloride	1.6E+02	nc	5.4E+02	nc	1.8E+02	nc	3.0E+02	nc
5.7E+00	r	5.7E+00	n	1	110-82-7	Cyclohexane	1.4E+02	sat	1.4E+02	sat	2.1E+04	nc	3.5E+04	nc
5.0E+00	I	5.0E+00	r	0	108-94-1	Cyclohexanone	1.0E+05	max	1.0E+05	max	1.8E+04	nc	1.8E+05	nc
2.0E-01	I	2.0E-01	r	0	108-91-8	Cyclohexylamine	1.2E+04	nc	1.0E+05	max	7.3E+02	nc	7.3E+03	nc
5.0E-03	I	5.0E-03	r	0	68065-85-8	Cyhalothrin/Karate	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc
1.0E-02	I	1.0E-02	r	0	52315-07-8	Cypermethrin	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc
7.5E-03	I	7.5E-03	r	0	56215-27-8	Cyromazine	4.6E+02	nc	4.6E+03	nc	2.7E+01	nc	2.7E+02	nc
1.0E-02	I	1.0E-02	r	0	1861-32-1	Daclathal	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc
3.0E-02	I	3.0E-02	r	0	75-99-0	Dalapon	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc
2.5E-02	I	2.5E-02	r	0	38515-41-8	Danitol	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc
2.4E-01	I	2.4E-01	r	0	72-54-8	DDD	2.4E+00	ca	1.0E+01	ca	2.8E-02	ca	2.8E-01	ca
3.4E-01	I	3.4E-01	r	0	72-55-9	DDE	1.7E+00	ca	7.0E+00	ca	2.0E-02	ca	2.0E-01	ca
3.4E-01	I	3.4E-01	r	0	50-29-3	DDT	1.7E+00	ca*	7.0E+00	ca*	2.0E-02	ca*	2.0E-01	ca*
1.0E-02	I	1.0E-02	r	0	1163-19-5	Decabromodiphenyl ether	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc
4.0E-05	I	4.0E-05	r	0	8065-48-3	Demeton	2.4E+00	nc	2.5E+01	nc	1.5E-01	nc	1.5E+00	nc
5.1E-02	h	5.1E-02	r	0	2303-16-4	Diallate	8.0E+00	ca	2.8E+01	ca	1.1E-01	ca	1.1E+00	ca
9.0E-04	h	9.0E-04	r	0	333-41-5	Diazinon	5.5E+01	nc	5.5E+02	nc	3.3E+00	nc	3.3E+01	nc
4.0E-03	n	4.0E-03	r	1	132-64-9	Dibenzofuran	2.9E+02	nc	3.1E+03	nc	1.5E+01	nc	2.4E+01	nc
1.0E-02	I	1.0E-02	r	0	106-37-6	1,4-Dibromobenzene	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc
8.4E-02	I	8.4E-02	r	1	124-48-1	Dibromochloromethane	1.1E+00	ca	2.6E+00	ca	8.0E-02	ca	1.3E-01	ca
1.4E+00	h	2.4E-03	x	1	96-12-8	1,2-Dibromo-3-chloropropane	4.5E-01	ca**	2.0E+00	ca**	2.1E-01	nc	4.8E-02	ca**
7.0E+00	I	7.0E+00	r	1	96-12-8	"CAL-Modified PRG"	1.9E-02	ca	4.6E-02	ca	9.6E-04	ca	1.6E-03	ca
8.5E+01	I	7.7E-01	i	1	106-93-4	1,2-Dibromoethane	6.9E-03	ca	2.8E-02	ca*	8.7E-03	ca*	7.6E-04	ca
1.0E-01	I	1.0E-01	r	0	84-74-2	Dibutyl phthalate	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc
3.0E-02	I	3.0E-02	r	0	1918-00-9	Dicamba	3.7E+02	sat	3.7E+02	sat	2.1E+02	nc	3.7E+02	nc
9.0E-02	I	9.0E-02	r	1	95-50-1	1,2-Dichlorobenzene	1.6E+01	nc	6.3E+01	nc	3.3E+00	nc	5.5E+00	nc
9.0E-04	n	9.0E-04	r	1	541-73-1	1,3-Dichlorobenzene	3.4E+00	ca	7.9E+00	ca	3.1E-01	ca	5.0E-01	ca
2.4E-02	h	3.0E-02	n	1	106-46-7	1,4-Dichlorobenzene	1.1E+00	ca	3.8E+00	ca	1.5E-02	ca	1.5E-01	ca
4.5E-01	I	4.5E-01	r	0	91-94-1	3,3-Dichlorobenzidine	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc
9.3E+00	r	9.3E+00	h	1	764-41-0	1,4-Dichloro-2-butene	7.9E-03	ca	1.8E-02	ca	7.2E-04	ca	1.2E-03	ca
2.0E-01	I	5.7E-02	h	1	75-71-8	Dichlorodifluoromethane	9.4E+01	nc	3.1E+02	nc	2.1E+02	nc	3.9E+02	nc
1.0E-01	h	1.4E-01	h	1	75-34-3	1,1-Dichloroethane	5.1E+02	nc	1.7E+03	nc	5.2E+02	nc	8.1E+02	nc
5.7E-03	I	5.7E-03	r	1		"CAL-Modified PRG"	2.8E+00	ca	6.0E+00	ca	1.2E+00	ca	2.0E+00	ca



Key: SFO=Cancer Slope Factor oral, inhalation RIDo=Reference Dose oral, inhalation IRIS H-EAST =NCEA xWithdrawn o-Other EPA Source rRoute-extrapolation ca=Cancer PRG ca\* (Where: nc < 100X ca) ce\*\* (Where: nc < 10X ca) \*\*\*=Non-Standard Method Applied (See Section 2.3 of the "Region 9 PRGs Table User's Guide") sat=Soil Saturation (See Section 4.5) max=Calling limit (See Section 2.1) DAF=Dilution Attenuation Factor (See Section 2.5) CAS=Chemical Abstract Services

TOXICITY INFORMATION				CONTAMINANT				PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS			
SFO 1/(mg/kg-d)	RIDo (mg/kg-d)	SFI 1/(mg/kg-d)	RIDi (mg/kg-d)	V	skin	CAS No.	Contaminant	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m <sup>3</sup> )	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)	Migration to Ground Water*	
				O	C										
6.0E-04	i	6.0E-04	r	0	0.10	576-26-1	2,6-Dimethylphenol	3.7E+01	nc	3.7E+02	nc	2.2E+00	nc	2.2E+01	nc
1.0E-03	i	1.0E-03	r	0	0.10	95-65-8	3,4-Dimethylphenol	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc
1.0E+01	h	1.0E+01	r	0	0.10	131-11-3	Dimethyl phthalate	1.0E+05	max	1.0E+05	max	3.7E+04	nc	3.6E+05	nc
1.0E-01	i	1.0E-01	r	0	0.10	120-81-6	Dimethyl terephthalate	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc
2.0E-03	i	2.0E-03	r	0	0.10	131-89-5	4,6-Dinitro-o-cyclohexyl phenol	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc
1.0E-04	h	1.0E-04	r	0	0.10	528-29-0	1,2-Dinitrobenzene	6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc
1.0E-04	h	1.0E-04	r	0	0.10	99-65-0	1,3-Dinitrobenzene	6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc
1.0E-04	h	1.0E-04	r	0	0.10	100-25-4	1,4-Dinitrobenzene	6.1E+00	nc	6.2E+01	nc	3.7E-01	nc	3.6E+00	nc
2.0E-03	i	2.0E-03	r	0	0.10	51-28-5	2,4-Dinitrophenol	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc
6.8E-01	i	6.8E-01	r	0	0.10	25321-14-6	Dinitrotoluene mixture	7.2E-01	ca	2.5E+00	ca	9.9E-03	ca	9.9E-02	ca
2.0E-03	i	2.0E-03	r	0	0.10	121-14-2	2,4-Dinitrotoluene (see DNT mixture for "ca")	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc
1.0E-03	h	1.0E-03	r	0	0.10	696-20-2	2,6-Dinitrotoluene (see DNT mixture for "ca")	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc
1.0E-03	i	1.0E-03	r	0	0.10	86-85-7	Dinoseb	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc
4.0E-02	h	4.0E-02	r	0	0.10	117-84-0	di-n-Octyl phthalate	2.4E+03	nc	2.5E+04	nc	1.5E+02	nc	1.5E+03	nc
1.1E-02	i	1.1E-02	r	0	0.10	123-91-1	1,4-Dioxane	4.4E+01	ca	1.6E+02	ca	6.1E-01	ca	6.1E+00	ca
1.8E+05	h	1.8E+05	r	0	0.03	1746-01-6	Dioxin (2,3,7,8-TCDD)	3.9E-06	ca	1.6E-05	ca	4.5E-08	ca	4.5E-07	ca
3.0E-02	i	3.0E-02	r	0	0.10	957-51-7	Diphenamid	1.8E+03	nc	1.8E+04	nc	1.1E+02	nc	1.1E+03	nc
2.5E-02	i	2.5E-02	r	0	0.10	122-38-4	Diphenylamine	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc
3.00E-04	n	3.00E-04	r	0	0.10	74-31-7	N,N-Diphenyl-1,4-benzenediamine (DPPD)	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc
3.0E-03	n	3.0E-03	r	0	0.10	122-66-7	1,2-Diphenylhydrazine	6.1E-01	ca	2.2E+00	ca	8.7E-03	ca	8.4E-02	ca
2.2E-03	i	2.2E-03	r	0	0.10	85-00-7	Diquat	1.8E+02	nc	1.8E+03	nc	1.1E+01	nc	1.1E+02	nc
8.8E+00	h	8.8E+00	r	0	0.10	1937-37-7	Direct black 38	1.3E+02	nc	1.4E+03	nc	8.0E+00	nc	8.0E+01	nc
8.1E+00	h	8.1E+00	r	0	0.10	2692-46-2	Direct blue 6	5.7E-02	ca	2.0E-01	ca	7.8E-04	ca	7.8E-03	ca
9.3E+00	h	9.3E+00	r	0	0.10	16071-86-6	Direct brown 95	6.0E-02	ca	2.1E-01	ca	8.3E-04	ca	8.3E-03	ca
4.0E-05	i	4.0E-05	r	0	0.10	298-04-4	Disulfoton	5.2E-02	ca	1.9E-01	ca	7.2E-04	ca	7.2E-03	ca
1.0E-02	i	1.0E-02	r	0	0.10	505-29-3	1,4-Dithiane	2.4E+00	nc	2.5E+01	nc	1.5E-01	nc	1.5E+00	nc
2.0E-03	i	2.0E-03	r	0	0.10	330-64-1	Diuron	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc
4.0E-03	i	4.0E-03	r	0	0.10	2439-10-3	Dodine	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc
2.0E-01	n	2.0E-01	r	0	0.10	7429-91-8	Dyprosium	1.6E+04	nc	1.0E+05	max	7.3E+03	nc	7.3E+03	nc
6.0E-03	i	6.0E-03	r	0	0.10	115-29-7	Endosulfan	3.7E+02	nc	3.7E+03	nc	2.2E+01	nc	2.2E+02	nc
2.0E-02	i	2.0E-02	r	0	0.10	146-73-3	Endothal	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc
3.0E-04	i	3.0E-04	r	0	0.10	72-20-8	Endrin	1.8E+01	nc	1.8E+02	nc	1.1E+00	nc	1.1E+01	nc
9.9E-03	i	9.9E-03	r	1	0.10	106-89-8	Epichlorohydrin	7.6E+00	nc	2.6E+01	nc	1.0E+00	nc	2.0E+00	nc
5.7E-03	r	5.7E-03	r	0	0.10	106-58-7	1,2-Epoxybutane	3.5E+02	nc	3.5E+03	nc	2.1E+01	nc	2.1E+02	nc
2.5E-02	i	2.5E-02	r	0	0.10	759-94-4	EPTC (S-Ethyl dipropylthiocarbamate)	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc







Key: SFO, I=Cancer Slope Factor oral, inhalation RfDo, I=Reference Dose oral, inhalation IIRIS H=HEAST n=CEA x=Withdrawn o=Other EPA Source r=Route-extrapolation ca=Cancer PRG nc=Noncancer PRG ca\* (where: nc < 100X ca) ca\*\* (where: nc < 10X ca) \*\*\*=Non-Standard Method Applied (See Section 2.3 of the "Region 9 PRGs Table User's Guide") sat=Soil Saturation (See Section 4.5) max=Calling limit (See Section 2.1) DAF=Dilution Attenuation Factor (See Section 2.5) CAS=Chemical Abstract Services

TOXICITY INFORMATION				CONTAMINANT				PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS		
SFO 1/(mg/kg-d)	RfDo (mg/kg-d)	SFI 1/(mg/kg-d)	RfDi (mg/kg-d)	V	CAS No.	Contaminant	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m <sup>3</sup> )	Tap Water (ug/l)	Migration to Ground Water DAF 20 (mg/kg)	DAF 1 (mg/kg)		
				skin O abs. C										
1.0E+00	h	1.0E-01	r	1	79-20-9	Methyl acetate	2.2E+04	nc	9.2E+04	nc	3.7E+03	nc	6.1E+03	nc
3.0E-02	h	2.4E-01	r	1	96-33-3	Methyl acrylate	7.0E+01	nc	2.3E+02	nc	1.1E+02	nc	1.8E+02	nc
2.4E-01	h	1.8E-01	r	0	95-53-4	2-Methylaniline (o-toluidine)	2.0E+00	ca	7.2E+00	ca	2.8E-02	ca	2.8E-01	ca
1.8E-01	h	1.8E-01	r	0	696-21-5	2-Methylaniline hydrochloride	2.7E+00	ca	9.6E+00	ca	3.7E-02	ca	3.7E-01	ca
5.0E-04	l	5.0E-04	r	0	94-74-6	2-Methyl-4-chlorophenoxyacetic acid	3.1E+01	nc	3.1E+02	nc	1.8E+00	nc	1.8E+01	nc
1.0E-02	l	1.0E-02	r	0	94-81-5	4-(2-Methyl-4-chlorophenoxy) butyric acid	6.1E+02	nc	6.2E+03	nc	3.7E+01	nc	3.6E+02	nc
1.0E-03	l	1.0E-03	r	0	93-65-2	2-(2-Methyl-4-chlorophenoxy) propionic acid	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc
1.0E-03	l	1.0E-03	r	0	16494-77-8	2-(2-Methyl-1,4-chlorophenoxy) propionic acid	6.1E+01	nc	6.2E+02	nc	3.7E+00	nc	3.6E+01	nc
8.6E-01	r	8.6E-01	h	1	108-87-2	Methylcyclohexane	2.6E+03	nc	8.7E+03	nc	3.1E+03	nc	5.2E+03	nc
2.5E-01	h	2.5E-01	r	0	101-77-9	4,4'-Methylenebisbenzamine	1.9E+00	ca	6.9E+00	ca	2.7E-02	ca	2.7E-01	ca
1.3E-01	h	1.3E-01	h	0	101-14-4	4,4'-Methylene bis(2-chloroaniline)	3.7E+00	ca*	1.3E+01	ca*	5.2E-02	ca*	5.2E-01	ca*
4.6E-02	l	4.6E-02	r	0	101-61-1	4,4'-Methylene bis(N,N'-dimethyl)aniline	1.1E+01	ca	3.7E+01	ca	1.5E-01	ca	1.5E+00	ca
7.5E-03	l	7.5E-03	h	1	74-95-3	Methylene bromide	6.7E+01	nc	2.3E+02	nc	3.7E+01	nc	6.1E+01	nc
1.7E-04	l	1.7E-04	l	0	101-68-8	Methylene chloride	9.1E+00	ca	2.1E+01	ca	4.1E+00	ca	4.3E+00	ca
6.0E-01	l	6.0E-01	l	1	78-93-3	4,4'-Methylene diphenyl diisocyanate	1.0E+01	nc	1.0E+02	nc	6.2E-01	nc	6.2E+00	nc
8.0E-02	h	8.0E-02	h	1	108-10-1	Methyl ethyl ketone	7.3E+03	nc	2.7E+04	nc	1.0E+03	nc	1.9E+03	nc
5.7E-04	r	5.7E-04	n	0	74-93-1	Methyl isobutyl ketone	7.9E+02	nc	2.8E+03	nc	8.3E+01	nc	1.6E+02	nc
1.4E+00	l	1.4E+00	l	1	80-62-6	Methyl Mercaptan	3.5E+01	nc	3.5E+02	nc	2.1E+00	nc	2.1E+01	nc
2.5E-04	l	2.5E-04	r	0	99-85-8	Methyl methacrylate	2.2E+03	nc	2.7E+03	sat	7.3E+02	nc	1.4E+03	nc
5.0E-02	l	5.0E-02	r	0	298-00-0	2-Methyl-5-nitroaniline	1.5E+01	nc	5.2E+01	ca	2.0E-01	ca	2.0E+00	ca
5.0E-02	l	5.0E-02	r	0	95-48-7	Methyl parathion	1.5E+01	nc	1.5E+02	nc	9.1E-01	nc	9.1E+00	nc
5.0E-03	h	5.0E-03	r	0	106-39-4	2-Methylphenol	3.1E+03	nc	3.1E+04	nc	1.8E+02	nc	1.8E+03	nc
2.0E-02	n	2.0E-02	r	0	106-44-5	3-Methylphenol	3.1E+02	nc	3.1E+03	nc	1.8E+01	nc	1.8E+02	nc
6.0E-03	h	6.0E-03	h	1	993-13-5	4-Methylphenol	1.2E+03	nc	1.2E+04	nc	7.3E+01	nc	7.3E+02	nc
7.0E-02	h	7.0E-02	r	1	25013-15-4	Methyl phosphonic acid	1.3E+02	nc	5.4E+02	nc	4.2E+01	nc	6.0E+01	nc
3.3E-03	n	3.3E-03	n	1	1634-04-4	Methyl styrene (mixture)	6.8E+02	sat	6.8E+02	sat	2.6E+02	nc	4.3E+02	nc
1.8E-03	l	1.8E-03	l	1	51219-45-2	Methyl styrene (alpha)	6.2E+01	ca*	1.6E+02	ca	1.9E+01	ca	1.3E+01	ca
2.8E-02	l	2.8E-02	r	0	21087-64-9	Methyl tertbutyl ether (MTBE)	1.7E+01	ca	3.6E+01	ca	3.7E+00	ca	6.2E+00	ca
2.0E-04	l	2.0E-04	r	0	2385-85-5	"CAL-Modified PRG"	9.2E+03	nc	9.2E+04	nc	5.5E+02	nc	5.5E+03	nc
2.0E-03	l	2.0E-03	r	0	2212-67-1	Metolactor (Dual)	1.5E+03	nc	1.5E+04	nc	9.1E+01	nc	9.1E+02	nc
5.0E-03	l	5.0E-03	r	0	7439-98-7	Metribuzin	2.7E-01	ca*	9.6E-01	ca	3.7E-03	ca	3.7E-02	ca
1.0E-01	l	1.0E-01	r	0	10599-90-3	Mirex	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc
2.0E-03	l	2.0E-03	r	0	300-78-5	Molinate	3.9E+02	nc	5.1E+03	nc	1.8E+02	nc	1.8E+02	nc
1.0E-01	l	1.0E-01	r	0	10599-90-3	Molybdenum	6.1E+03	nc	6.2E+04	nc	3.7E+02	nc	3.6E+03	nc
2.0E-03	l	2.0E-03	r	0	300-78-5	Monochloramine	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc
2.0E-03	l	2.0E-03	r	0	300-78-5	Naled	1.2E+02	nc	1.2E+03	nc	7.3E+00	nc	7.3E+01	nc

Key: SFO=Cancer Slope Factor oral, inhalation RfD=Reference Dose oral, inhalation IRIS IRIS HEAST =NCEA xWithdrawn o=Other EPA Source r=Route-extrapolation ca=Cancer PRG nc=Noncancer PRG ca\*\* (where: nc < 100X ca) ca\*\* (where: nc < 10X ca) \*\*\*=Non-Standard Method Applied (See Section 2.3 of the "Region 9 PRGs Table User's Guide") sat=Soil Saturation (See Section 4.5) max=Calling limit (See Section 2.1) DAF=Dilution Attenuation Factor (See Section 2.5) CAS=Chemical Abstract Services

TOXICITY INFORMATION				CONTAMINANT				PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS		
SFO 1/(mg/kg-d)	RfD (mg/kg-d)	SFI 1/(mg/kg-d)	RfD (mg/kg-d)	V	abs.	CAS No.	Contaminant	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m <sup>3</sup> )	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)	
				skin	soils							Migration to Ground Water		
1.0E-01	1.0E-01	1.0E-01	1.0E-01	r	0	15299-99-7	Napropamide	6.1E+03	6.2E+04	nc	3.6E+03	nc	1.3E+02	7.0E+00
2.0E-02				0	0	7448-02-0	Nickel (soluble salts)	1.6E+03	2.0E+04	nc	7.3E+02	nc		
		8.4E-01		0	0		Nickel refinery dust			ca	8.0E-03	ca		
		1.7E+00		0	0	12095-72-2	Nickel subsulfide		1.1E+04	ca	4.0E-03	ca		
				0	0	14797-55-8	Nitrate+++			nc	1.0E+04	nc		
				0	0	14797-65-0	Nitrite+++			nc	1.0E+03	nc		
2.86E-05		2.86E-05		h	0	89-74-4	2-Nitroaniline	1.7E+00	1.8E+01	nc	1.0E-01	nc	1.0E+00	
5.0E-04		5.7E-04		h	1	98-95-3	Nitrobenzene	2.0E+01	1.0E+02	nc	2.1E+00	nc	3.4E+00	
7.0E-02		7.0E-02		r	0	87-20-9	Nitrofurantoin	4.3E+03	4.3E+04	nc	2.6E+02	nc	2.6E+03	
1.5E+00		1.5E+00		r	0	59-97-0	Nitrofurazone	3.2E-01	1.1E+00	ca	4.5E-03	ca	4.5E-02	
1.4E-02		1.4E-02		r	0	55-83-0	Nitroglycerin	3.5E+01	1.2E+02	ca	4.8E-01	ca	4.8E+00	
1.0E-01		1.0E-01		r	0	566-86-7	Nitroguanidine	6.1E+03	6.2E+04	nc	3.7E+02	nc	3.6E+03	
9.4E+00	5.7E-03	9.4E+00	5.7E-03	r	1	79-46-9	2-Nitropropane	2.4E-02	5.8E-02	ca	1.2E-03	ca	1.2E-03	
5.4E+00		5.8E+00		r	1	924-16-3	N-Nitrosodi-n-butylamine	1.7E-01	6.2E-01	ca	2.4E-03	ca	2.4E-02	
2.8E+00		2.8E+00		r	0	1116-54-7	N-Nitrosodiphenylamine	3.2E-03	1.1E-02	ca	4.5E-05	ca	4.5E-04	
1.5E+02		1.5E+02		r	0	55-18-5	N-Nitrosodimethylamine	9.5E-03	3.4E-02	ca	1.4E-04	ca	1.3E-03	
5.1E+01		4.9E+01		r	0	62-75-9	N-Nitrosodimethylamine	9.9E+01	3.5E+02	ca	1.4E+00	ca	1.4E+01	
4.9E-03		4.9E-03		r	0	86-30-6	N-Nitrosodiphenylamine	6.9E-02	2.5E+01	ca	9.6E-04	ca	9.6E-03	
7.0E+00		7.0E+00		r	0	621-64-7	N-Nitroso di-n-propylamine	2.2E+02	7.8E+02	ca	3.1E-04	ca	3.1E-03	
2.2E+01		2.2E+01		r	0	10595-95-6	N-Nitroso-N-methylethylamine	2.3E-01	8.2E-01	ca	3.1E-03	ca	3.2E-02	
2.1E+00		2.1E+00		r	0	930-55-2	N-Nitrosopyrrolidine	3.7E+02	1.0E+03	sat	3.7E+01	nc	6.1E+01	
1.0E-02		1.0E-02		r	1	99-08-1	m-Nitrotoluene	3.7E+02	1.0E+03	sat	3.7E+01	nc	6.1E+01	
1.0E-02		1.0E-02		r	1	99-08-1	o-Nitrotoluene	3.7E+02	1.0E+03	sat	3.7E+01	nc	6.1E+01	
1.0E-02		1.0E-02		r	1	99-99-0	p-Nitrotoluene	3.7E+02	1.0E+03	sat	3.7E+01	nc	6.1E+01	
4.0E-02		4.0E-02		r	0	27314-13-2	Norflurazon	4.3E+01	2.5E+04	nc	1.5E+02	nc	1.5E+03	
7.0E-04		7.0E-04		r	0	85509-19-9	NuStar	1.8E+02	1.8E+03	nc	2.6E+00	nc	2.6E+01	
3.0E-03		3.0E-03		r	0	32536-52-0	Octabromodiphenyl ether	1.8E+02	1.8E+03	nc	1.1E+01	nc	1.1E+02	
5.0E-02		5.0E-02		r	0	2691-41-0	Oxalazine	3.1E+03	3.1E+04	nc	1.8E+02	nc	1.8E+03	
2.0E-03		2.0E-03		r	0	152-18-9	Oxalazine (HMX)	1.2E+02	1.2E+03	nc	7.3E+00	nc	7.3E+01	
5.0E-02		5.0E-02		r	0	19044-98-3	Oxalazine	3.1E+03	3.1E+04	nc	1.8E+02	nc	1.8E+03	
5.0E-03		5.0E-03		r	0	19666-30-9	Oxadiazon	3.1E+02	3.1E+03	nc	1.8E+01	nc	1.8E+02	
2.8E-02		2.5E-02		r	0	23135-22-0	Oxamyl	1.5E+03	1.5E+04	nc	9.1E+01	nc	9.1E+02	
3.0E-03		3.0E-03		r	0	42874-03-3	Oxyfluorfen	1.8E+02	1.8E+03	nc	1.1E+01	nc	1.1E+02	
1.3E-02		1.3E-02		r	0	76736-62-0	Pachlobutrazol	7.9E+02	8.0E+03	nc	4.7E+01	nc	4.7E+02	
4.5E-03		4.5E-03		r	0	4685-14-7	Paraquat	2.7E+02	2.8E+03	nc	1.6E+01	nc	1.6E+02	
6.0E-03		6.0E-03		r	0	56-38-2	Parathion	3.7E+02	3.7E+03	nc	2.2E+01	nc	2.2E+02	







Key: SFo is Cancer Slope Factor oral, inhalation; RfDo is Reference Dose oral, inhalation; RfD is Reference Dose oral, inhalation; H=HEAST; N=NCEA; W=Withdrawn; o=Other EPA Source; R=Route-extrapolation; ca=Cancer PRG; nc=Noncancer PRG; ca\* (Where: nc < 100X ca) ca\*\* (Where: nc < 10X ca)  
 +---=Non-Standard Method Applied (See Section 2.3 of the "Region 9 PRGs Table User's Guide"); sat=Soil Saturation (See Section 4.5); max=Calling limit (See Section 2.1); DAF=Dilution Attenuation Factor (See Section 2.5); CAS=Chemical Abstract Services

TOXICITY INFORMATION				CONTAMINANT				PRELIMINARY REMEDIAL GOALS (PRGs)				SOIL SCREENING LEVELS	
SFo 1/(mg/kg-d)	RfDo (mg/kg-d)	SF 1/(mg/kg-d)	RfD (mg/kg-d)	V	CAS No.	Contaminant	Residential Soil (mg/kg)	Industrial Soil (mg/kg)	Ambient Air (ug/m <sup>3</sup> )	Tap Water (ug/l)	DAF 20 (mg/kg)	DAF 1 (mg/kg)	
h	h	h	h	0	0		ca	ca	ca	ca	ca	ca	
2.0E+01	h	2.0E+01	r	0	0.10	5216-25-1	ca	ca	ca	ca	ca	ca	
2.4E+02	h	2.4E+02	r	0	0.10	981-11-5	ca*	ca*	ca	ca	ca	ca	
5.0E+04	h	5.0E+04	r	0	0.10	3699-24-5	nc	nc	nc	nc	nc	nc	
7.6E+03	n	6.8E+03	n	1	109-99-9	Tetrahydrofuran	ca	ca	ca	ca	ca	ca	
6.6E+05	h	6.6E+05	r	0	7440-28-0	Thallium and compounds+++	nc	nc	nc	nc	nc	nc	
1.0E+02	h	1.0E+02	r	0	28249-77-6	Thiobencarb	nc	nc	nc	nc	nc	nc	
5.0E+02	n	5.0E+02	r	0	N/A	Thiocyanate	nc	nc	nc	nc	nc	nc	
3.0E+04	h	3.0E+04	r	0	39198-18-4	Thiofanox	nc	nc	nc	nc	nc	nc	
8.0E+02	h	8.0E+02	r	0	23584-95-8	Thiophanate-methyl	nc	nc	nc	nc	nc	nc	
5.0E+03	h	5.0E+03	r	0	137-26-8	Thiram	nc	nc	nc	nc	nc	nc	
6.0E+01	h	6.0E+01	r	0	108-88-3	Tin (inorganic, see tributyltin oxide for organic tin)	nc	nc	nc	nc	nc	nc	
2.0E+01	h	2.0E+01	r	1	108-88-3	Toluene	sat	sat	sat	sat	sat	sat	
6.0E+01	h	3.2E+00	r	0	95-80-7	Toluene-2,4-diamine	ca	ca	ca	ca	ca	ca	
2.0E+01	h	1.1E+00	r	0	95-70-5	Toluene-2,5-diamine	nc	nc	nc	nc	nc	nc	
7.5E+03	h	2E-01	r	0	105-49-0	p-Toluidine	ca	ca	ca	ca	ca	ca	
1.3E+02	h	1.1E+00	r	0	8001-35-2	Toxaphene	ca	ca	ca	ca	ca	ca	
1.0E+02	h	1.1E+00	r	0	66841-25-6	Tralomehrin	nc	nc	nc	nc	nc	nc	
5.0E+03	h	7.5E-03	r	0	615-54-3	Triallate	nc	nc	nc	nc	nc	nc	
3.0E+04	h	3.4E-02	r	0	2303-77-5	Triasulfuron	nc	nc	nc	nc	nc	nc	
2.9E+02	h	2.9E-02	r	0	33663-50-2	1,2,4-Trichlorobenzene	ca	ca	ca	ca	ca	ca	
1.0E+02	h	5.7E-02	r	1	120-82-1	Tributyltin oxide (TBTO)	nc	nc	nc	nc	nc	nc	
2.8E+01	h	6.3E-01	r	1	71-55-6	2,4,6-Trichloroaniline	ca	ca	ca	ca	ca	ca	
4.0E+01	h	4.0E-03	r	1	79-00-5	2,4,6-Trichloroaniline hydrochloride	ca	ca	ca	ca	ca	ca	
3.0E+04	h	4.0E-01	r	1	79-01-6	1,2,4-Trichlorobenzene	ca	ca	ca	ca	ca	ca	
1.0E+02	h	1.0E-02	r	1	75-68-4	1,1,1-Trichloroethane	ca	ca	ca	ca	ca	ca	
1.0E+04	h	1.0E-01	r	0	95-95-4	1,1,2-Trichloroethane	ca	ca	ca	ca	ca	ca	
1.0E+04	h	1.0E-02	r	0	88-06-2	Trichloroethylene (TCE)	ca	ca	ca	ca	ca	ca	
7.0E+02	h	7.0E-02	r	0	88-06-2	Trichlorofluoromethane	ca	ca	ca	ca	ca	ca	
8.0E+03	h	8.0E-03	r	0	93-76-5	2,4,5-Trichlorophenol	ca	ca	ca	ca	ca	ca	
5.0E+03	h	5.0E-03	r	1	598-77-6	2,4,6-Trichlorophenol	ca	ca	ca	ca	ca	ca	
2.0E+00	n	2.0E+00	r	1	96-18-4	"CAL-Modified PRG" 2,4,5-Trichlorophenoxyacetic Acid	nc**	nc**	nc**	nc**	nc**	nc**	
3.0E+00	n	3.0E+00	r	1	93-72-1	2-(2,4,5-Trichlorophenoxy) propionic acid	ca	ca	ca	ca	ca	ca	
1.0E+01	n	1.0E+01	r	1	598-77-6	1,1,2-Trichloropropane	ca	ca	ca	ca	ca	ca	
2.0E+01	n	2.0E+01	r	1	96-18-4	1,2,3-Trichloropropane	ca	ca	ca	ca	ca	ca	



**APPENDIX E**

**ATSDR ToxFAQs**



# BARIUM

CAS # 7440-39-3

Agency for Toxic Substances and Disease Registry ToxFQA's

September 1995

This fact sheet answers the most frequently asked health questions (FAQs) about barium. For more information, call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.

**SUMMARY: Exposure to barium occurs mostly in the workplace or from drinking contaminated water. Ingesting high levels of barium can cause problems with the heart, stomach, liver, kidneys, and other organs. This chemical has been found in at least 649 of 1,416 National Priorities List sites identified by the Environmental Protection Agency.**

### What is barium?

(Pronounced bär'ē-əm)

Barium is a silvery-white metal found in nature. It occurs combined with other chemicals such as sulfur or carbon and oxygen. These combinations are called compounds. Barium compounds can also be produced by industry.

Barium compounds are used by the oil and gas industries to make drilling muds. Drilling muds make it easier to drill through rock by keeping the drill bit lubricated. They are also used to make paint, bricks, tiles, glass, and rubber.

A barium compound (barium sulfate) is sometimes used by doctors to perform medical tests and to take x-rays of the stomach.

### What happens to barium when it enters the environment?

- Barium gets into the air during the mining, refining, and production of barium compounds, and from the burning of coal and oil.
- Some barium compounds dissolve easily in water and are found in lakes, rivers, and streams.
- Barium is found in most soils and foods at low levels.
- Fish and aquatic organisms accumulate barium.

### How might I be exposed to barium?

- Breathing very low levels in air, drinking water, and eating food.
- Breathing higher levels in air while working in industries that make or use barium compounds.
- Drinking water containing high levels of barium from natural sources.
- Breathing air near barium mining or processing plants.

### How can barium affect my health?

The health effects of the different barium compounds depend on how well the compound dissolves in water. Barium compounds that do not dissolve well in water are not generally harmful and are often used by doctors for medical purposes.

Those barium compounds that dissolve well in water may cause harmful health effects in people. Ingesting high levels of barium compounds that dissolve well in water over the short term has resulted in

- Difficulties in breathing
- Increased blood pressure
- Changes in heart rhythm
- Stomach irritation.

ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html>

- Brain swelling
- Muscle weakness
- Damage to the liver, kidney, heart, and spleen.

We don't know the effects in people of ingesting low levels of barium over the long term. Animal studies have found increased blood pressure and changes in the heart from ingesting barium over a long time. We don't know the effects of barium from breathing it or from touching it.

### How likely is barium to cause cancer?

The Department of Health and Human Services, the International Agency for Research on Cancer, and the Environmental Protection Agency (EPA) have not classified barium as to its human carcinogenicity.

Barium has not been classified because there are no studies in people and the two available animal studies were inadequate to determine whether or not barium causes cancer.

### Is there a medical test to show whether I've been exposed to barium?

There is no routine medical test to show whether you have been exposed to barium. However, doctors can measure barium in the blood, bones, urine, and feces, using very complex instruments. Due to the complexity of the tests, these tests are usually done only for cases of severe barium poisoning and for medical research.

### Has the federal government made recommendations to protect human health?

EPA allows 2 parts of barium per million parts of drinking water (2 ppm). EPA requires that discharges or spills into the

environment of 10 pounds or more of barium cyanide be reported.

The Occupational Safety and Health Administration (OSHA), the National Institute for Occupational Safety and Health (NIOSH), and the American Conference of Governmental Industrial Hygienists (ACGIH) have set an occupational exposure limit of 0.5 milligrams of soluble barium compounds per cubic meter of air ( $0.5 \text{ mg/m}^3$ ) for an 8-hour workday, 40-hour workweek.

The OSHA exposure limit for barium sulfate dust in air is 5 to 15 milligrams of barium per cubic meter of air ( $5\text{--}15 \text{ mg/m}^3$ ).

NIOSH currently recommends that a level of  $50 \text{ mg/m}^3$  be considered immediately dangerous to life and health. This is the exposure level of barium that is likely to cause permanent health problems or death.

### Glossary

Carcinogenicity: Ability to cause cancer.

Ingesting: Taking food or drink into your body.

Long-term: Lasting one year or longer.

Milligram (mg): One thousandth of a gram.

ppm: Parts per million.

Short-term: Lasting 14 days or less.

Soluble: Dissolves well in liquid.

### References

Agency for Toxic Substances and Disease Registry (ATSDR). 1992. Toxicological profile for barium. Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop E-29, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 404-639-6359. ToxFAQs Internet address via WWW is <http://www.atsdr.cdc.gov/toxfaq.html> ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

